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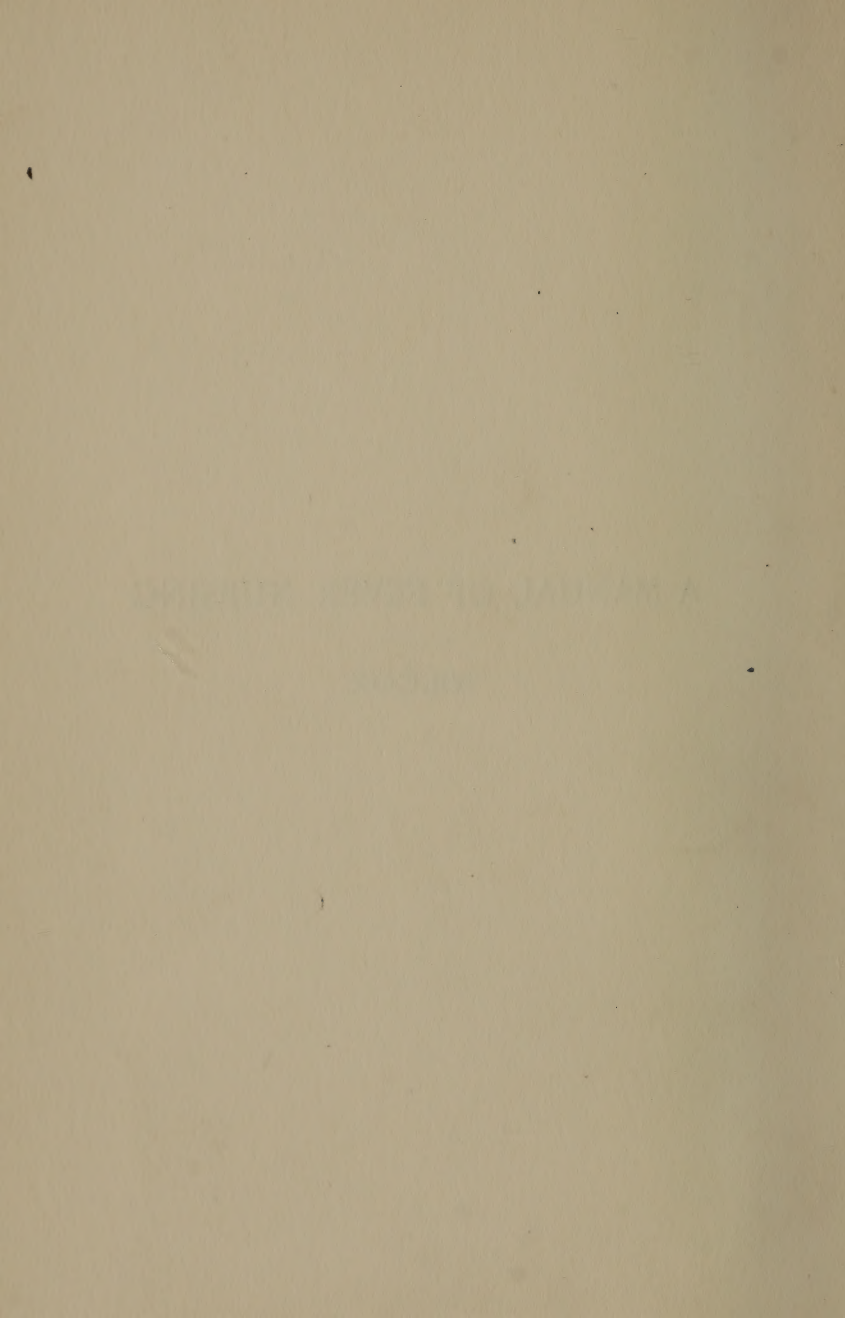
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A MANUAL OF FEVER NURSING

WILCOX



A MANUAL OF FEVER NURSING

BY

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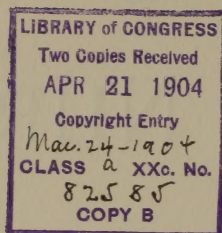
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PREFACE.

This volume contains the lectures on fever nursing which were delivered in substance to the nurses of St. Mark's Hospital during the season of 1903-4. It is believed that the subject has been very completely and comprehensively treated and in accordance with the present state of practice. The work of preparing the manuscript for the printer, reading proof and making index has been very conscientiously performed by Doctor Henry Hubbard Pelton, to whom the author would extend his most appreciative acknowledgment.

NEW YORK CITY,
April, 1904.

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CHAPTER I.

FEVER.

Definition: Causes: Physiology: Varieties: Lysis: Crisis: Recrudescence: Relapse: Normal and Abnormal Temperature: Symptoms.

Fever.—*Synonym*, pyrexia. Fever, in the ordinary acceptance of the term, is understood to signify an abnormally high bodily temperature. In the present state of our knowledge, however, it must be considered as a group of symptoms caused by some derangement of the chemistry of the body which may be the result of a variety of causes. These causes may act from within, being generated in the body, or from without, having been introduced into the body. In either case they act by affecting the nervous system. For instance, fever may result from the failure of the body to throw off certain excrementitious products, as in cases of uremic poisoning; from certain changes in the blood, as in cases of anemia; from exposure to extremes of heat, as in sunstroke; from various intestinal disturbances; from mental abnormalities, as in hysteria. Most often, however, rises of bodily temperature are due to the products of bacterial infection. The bac-

teria as they grow in the body throw off certain poisonous substances which are taken up by the circulating blood and affect the nervous mechanism which controls bodily heat.

It is believed that in the central nervous system a center or centers exist which control the heat production and the heat radiation (the two factors which regulate the temperature) of the body. Fever, therefore, is the result of the abnormal working of this nervous mechanism.

Heat production and heat radiation being responsible for the maintenance of a fairly constant bodily temperature, it follows that when variations from this temperature occur, they must be the result of abnormalities of these factors. Thus fever may follow an increased heat production, a diminished heat radiation, or any other lack of proper ratio between the workings of these two functions. As a matter of fact, however, the most usual cause of fever is an increased production of bodily heat. Abnormalities of heat radiation are rare.

The word "fever" is incorporated in the designations of certain diseases of which, to the superficial observer at least, the chief manifestation is a rise in bodily temperature. Of these diseases, which are sometimes spoken of as the essential fevers, typhoid fever may serve as an example. However, in these diseases as in all others the fever, that is, the high bodily

temperature, is merely a part of the clinical picture, or in other words only a symptom.

Fevers are spoken of as *continued*, *intermittent* or *remittent*. A *continued fever* is one in which the temperature maintains a continued high level with only slight variations. Typhoid fever may be taken as an example of this type. An *intermittent fever* is one marked by periods when the temperature may fall to normal or even below this point, but only to rise again. Of this type ordinary malarial fever may serve as an example. A *remittent fever* is one characterized by a temperature continuously above the normal, and which falls and rises but is without intermissions. Remittent malarial fever may be considered as an example of this class.

Again, fevers are classified as *sthenic* (dynamic) and *asthenic* (adynamic). A *sthenic fever* is one characterized by a hot, dry skin, thirst, full, strong, rapid, tense pulse, high temperature and perhaps active delirium. An *asthenic fever* is one in which the skin is cold and clammy, the pulse feeble, and the nervous system depressed.

In rare cases what is called an *inverse fever* occurs. In this type the elevation is highest in the morning and lowest in the evening, the opposite of the usual rule.

The return of an elevated temperature to normal is known as the defervescence. This may take place by a gradual fall with intermissions during which there is

a rise but not to so high a point as that at which the fall began, and, as a rule, each successive rise is less than its predecessor; a defervescence of this character is called a defervescence by *lysis*. At the termination of typhoid fever the temperature drops in this manner. When a temperature falls to normal or below this point in the course of a few hours the defervescence is spoken of as occurring by *crisis*. The usual defervescence in lobar pneumonia is of this type.

After defervescence has taken place a rise of temperature lasting for only a short time sometimes happens; this is spoken of as a *recrudescence*. Such a circumstance is usually due to some insignificant and often unaccountable cause. When the fever and the other symptoms of the original disease return it is evident that re-infection has taken place and this manifestation is known as a *relapse*. To guard against the possibility of such occurrences, and in order that they may be immediately detected it is wise to take the temperature at least once in the day, preferably in the evening, for a number of days after it has become normal.

The temperature of convalescent persons is much more easily affected than that of those in health. Errors in diet, constipation, too much muscular exertion or mental excitement are often followed by rises of temperature in such cases. A rise of three degrees or more may signify the onset of some complication or

a relapse and consequently should immediately be reported to the attending physician. Sudden falls in temperature are likely to indicate collapse. In apoplexy and febrile diseases a considerable rise in temperature often takes place just before death, while in chronic wasting diseases the temperature may be subnormal for a number of hours before the end finally takes place. The temperature of infants and young children is much more easily influenced than that of adults, and consequently even slight constitutional disturbances may cause a fever of considerable height.

Bodily temperature is nearly the same in all parts of the body, which may be accounted for by the fact that all parts are supplied by the blood, one of the functions of which is the distribution of heat. The average temperature of the human body in health is 98.6° F. (37° C.), but any temperature from 97.5° F. (36.5° C.) to 99.5° F. (37.5° C.) is not considered abnormal, since bodily heat may be influenced by various factors even when disease is absent. The temperature of the body uninfluenced by disease may vary thus:

(a) With the time of day. It is usually highest from four to seven o'clock P. M. Its maximum is maintained for three or four hours when a slow and gradual drop begins, lasting until from two to six o'clock A. M., at which time its minimum is reached; consequently at this time vitality is at its lowest ebb. As the morning progresses a gradual rise takes place

until the normal 98.6° F. (37° C.) is reached. In persons who sleep by day and work at night the temperature is lowest in the evening and highest in the early morning.

(b) With the performance of bodily functions. There is usually a slight elevation after a full meal due to the active performance of digestion, and also during muscular exercise, though, if at this time there is profuse perspiration, there is, as a rule, a decrease in the bodily temperature.

(c) With the part of the body used in measuring the temperature. These variations are slight and of no importance. Rectal or vaginal temperature is slightly higher than that of the mouth or axilla. The sensation imparted to the hand by the feel of the body is no guide to the height of the bodily temperature, though at times fever may be suspected and later proven by the use of the thermometer.

(d) With the age of the individual. In the infant it is slightly higher than in the adult and in old age it is a trifle lower, as the following table shows :

Normal temperature in the infant..	99.5° F. (37.5° C.)
Normal temperature under 25 years.	99° F. (37.2° C.)
Normal temperature about 40 years.	98.8° F. (37.1° C.)
Normal temperature in old age....	98.6° F. (37° C.)

(e) With the season of the year. Bodily temperature is very slightly higher in summer than in winter.

.

A temperature above or below the limits previously indicated, signifies the existence of some abnormality of the functions of the body, and often the degree of the severity of this departure from the normal is in direct ratio to the height of the fever. Bodily temperature may, however, descend as low as 77° F. (25° C.) or ascend as high as 108° F. (42.5° C.) without death resulting, but such extremes, when maintained for any considerable period of time, almost invariably terminate life. Extraordinary cases are on record of very low and high temperatures. After long exposure to severe cold a temperature of 75° F. (24° C.) has been noted and the individual has recovered, and cases of sunstroke have occurred in which the temperature has risen to 112° F. (44.5° C.) without causing death.

In hospitals patients are sometimes found who will cause the column of mercury in the thermometer to rise to very unusual heights. This is accomplished by shaking the instrument or by rubbing its bulb upon the bed clothing. Such patients are usually malingerers, and if carefully watched can be detected and prevented from practicing such deceptions.

In shock, after hemorrhage, in certain forms of nervous disease, during marked alcoholic intoxication, especially if the individual has been exposed to cold and damp weather, and in any other condition producing a considerable weakening of vitality and a consequent condition of collapse a subnormal temperature may exist.

The various ranges of bodily temperature may be classified thus:

Temperature of collapse.	95°- 97°F. (35 °-36.1°C.)
Subnormal temperature..	97°- 98°F. (36.1°-36.7°C.)
Normal temperature.....	98°- 99°F. (36.7°-37.2°C.)
Temperature of "feverishness"	99°-100°F. (37.2°-37.8°C.)
Slight fever.....	100°-101°F. (37.8°-38.4°C.)
Moderate fever.....	102°-103°F. (38.9°-39.5°C.)
High fever.....	104°-105°F. (40 °-40.5°C.)
Intense fever.....	105°-106°F. (40.5°-41.1°C.)
Hyperpyrexia.....	106°F. (41.1°C.) and above

An elevation in bodily temperature is, as a rule, accompanied by certain symptoms referable to the various tissues and organs. Not all these symptoms show themselves in every case and they may not all be present in a selected case, but many of them are likely to be noticed in a patient who has any considerable rise in temperature. In certain diseases various of these symptoms may be particularly marked, and this fact often is of great aid in diagnosis. Instances are the conjunctivitis that usually accompanies measles and the sore throat that is a feature of the onset of scarlet fever. If the fever is caused by inflammation localized in any part of the body, there are usually manifestations which call the attention of both the patient and the observer to this part. As an example the pain in the chest, the cough, and the shortness of breath of pneu-

monia immediately suggest some interference with the proper action of the lungs.

Febrile diseases in the adult are usually ushered in by a distinct chill, with marked shivering, pallor, blueness of the lips, chattering of the teeth and inability to keep warm, no matter how thickly covered, or by chilly feelings of greater or less severity. In the child it is often a convulsion, which may vary in intensity from slight muscular tremors of face and extremities to distressing movements of the entire body, which indicates the onset of fever. Following the initial chill or convulsion the rise in temperature, accompanied by other symptoms, appears.

THE SYMPTOMS OF FEVER.

Symptoms Referable to the Skin.—The skin is as a rule hot and dry and the patient complains that there is “fever” or that he “feels feverish,” although it is quite possible for the temperature to rise to 102° – 104° F. (38.9° – 40° C.) without being noticed by the patient. At times, and more often in some diseases than in others, the skin may be damp with a cool perspiration. Various eruptions associated with the different eruptive fevers may appear. These will be described later.

Tiny vesicles (water blisters) may show themselves, often in great numbers, upon various parts of the body; these need cause no alarm since they indicate nothing

worthy of notice. Delicate skins often show a general rosy blush which pressure with the finger-tip causes to disappear, but which immediately reappears upon removal of the pressure. This phenomenon is probably due to an increased quantity of blood in the cutaneous capillaries. In the late stages of fevers the outer layers of the skin are likely to scale off. Especially is this a feature of the eruptive diseases. At times large pieces of epidermis may be peeled off, notably after typhoid fever, when the skin of the fingers or toes may come away almost intact, forming veritable "moulds" of the parts.

Symptoms Referable to the Mucous Membranes.

—The so-called "fever sore" (*herpes labialis*) is likely to be present, especially in malaria and pneumonia. There is, even early in fevers, thirst and a tendency to dryness of the mouth and tongue. The latter may be of brighter pink than normal or coated with a grayish or whitish fur, swollen and often shows indentations caused by the teeth. As the fever reaches its height the upper lip may be drawn back so as to show the teeth, and the tongue and lips become covered with a dirty, brown, foul, viscid deposit, consisting of food particles, cells from the lining of the mouth, mucus and bacteria, which is termed *sordes*. The lips may become fissured and the gums spongy and bleeding. At first the tongue may be coated only down its middle while its margin is redder than normal; as the disease progresses the

tongue may tend to become dry at night while it remains moist by day. When the fever becomes very severe it may be difficult for the patient to extend the organ and it becomes tremulous, brown, dry, crusted and cracked. Bleeding from the fissures readily takes place. As the patient recovers the tongue gradually assumes its normal appearance, which process begins at the tip and extends progressively backward.

The pharynx is at first dry and may be the seat of a catarrhal inflammation, the tonsils and fauces may be swollen or ulcerated. The characteristic appearances of the throat in scarlet fever, diphtheria, etc., will be described in the sections devoted to those diseases. The salivary glands may be swollen and tender. The mucous membranes of the nose and eyes are likely to be congested and their secretions may be increased. There may be nose-bleed, especially early in typhoid fever.

Symptoms Referable to the Organs of Digestion.

—The appetite is greatly diminished or entirely absent. The mere thought of food may be distasteful to the patient. At the onset of febrile disease nausea is common and vomiting often follows. Gas in the intestine is a less common symptom. It usually causes little discomfort and may not be worthy of notice except in typhoid fever, in which disease it frequently occurs and is the result chiefly of a paralysis of the muscular coat of the bowel caused by the general infection rather than

that of the presence and growth of the bacteria in the intestine. Usually in fevers the bowels are constipated. Diarrhea formerly was considered a feature of typhoid fever, but constipation is frequently present.

Symptoms Referable to the Circulatory System.—

The usual pulse of febrile disease is one of increased force and frequency and of high tension. As a rule the increase in these qualities is proportionate to the height of the temperature as the following table shows, though in certain patients the acceleration may not be marked even with high fever.

Temperature of 98°F. (36.7°C.)	corresponds to a pulse of 60
Temperature of 99°F. (37.2°C.)	corresponds to a pulse of 70
Temperature of 100°F. (37.8°C.)	corresponds to a pulse of 80
Temperature of 101°F. (38.4°C.)	corresponds to a pulse of 90
Temperature of 102°F. (38.9°C.)	corresponds to a pulse of 100
Temperature of 103°F. (39.5°C.)	corresponds to a pulse of 110
Temperature of 104°F. (40 °C.)	corresponds to a pulse of 120
Temperature of 105°F. (40.5°C.)	corresponds to a pulse of 130
Temperature of 106°F. (41.1°C.)	corresponds to a pulse of 140

In children the pulse is particularly susceptible to rises of bodily temperature, rates of 150 to 190 per minute not being uncommon. In adults a rate of 110 to 130 is not infrequently observed. feebler and smaller; in extreme cases it may become so rapid and weak as to be uncountable and impart merely a sense of undulation to the finger—the so-called running pulse. A dicrotic pulse (one with a double

beat), an intermittent pulse or one irregular in force and frequency is an indication of heart weakness. Any sudden increase in the rapidity or weakness of the pulse is likely to indicate the onset of some complication. Position, muscular action and emotional excitement influence the strength and rapidity of the pulse to a considerable degree. Consequently in fevers the recumbent position should be insisted on, for conservation of the heart's strength may be a considerable factor in the preservation of the patient's life if the disease prove a protracted one.

Symptoms Referable to the Respiratory System.—

In fever the number of respirations per minute may be slightly increased, and the depth of the breathing diminished even when no lung involvement is associated with the disease. There may be cough due to an accompanying bronchitis. When pulmonary involvement co-exists the respiration may be rapid, irregular and painful. In marked pulmonary disease the breathing may become very difficult or impossible when the patient is lying and it may be necessary to allow him to sit up in bed with his back supported by a rest. When cough exists it is often accompanied by expectoration, the character of which will be described in the sections devoted to the febrile pulmonary diseases. Specimens of this should be retained for examination by the physician.

Symptoms Referable to the Urinary System.—The urine of a beginning fever is less in quantity than in health, of higher specific gravity, of darker color and possibly turbid. It may cause a burning sensation on being passed, due to its increased acidity. As the disease progresses toward recovery the quantity increases and the urine becomes more nearly normal in other respects. In convalescence the quantity may be even greater than in health. Fever urine on standing often deposits a red or reddish-brown sediment, consisting usually of uric acid or urates, which are the products of the unusual tissue changes which take place during febrile conditions. In severe febrile disease albumin, casts and even blood may appear; these, however, do not of necessity indicate permanent impairment of the kidneys. Retention of urine is a rare concomitant of fever.

Symptoms Referable to the Nervous System.—The initial chill or convulsion of fever has been discussed above (p. 17). When a chill manifests itself in the course of a fever it is likely to signify a sudden alteration for the worse in the patient's condition or the onset of a complication. Consequently such an event should be immediately reported to the attending physician. The convulsion of beginning fever, as a rule, is not the result of any change in the nervous system but is caused by the poison of the disease. Convulsions developing later in febrile disease not involving the

nervous system are rare and may be due either to hysteria or to the presence in the system of substances which should have been eliminated through the kidneys. Urinary examination may throw light upon the causation of such convulsions, hence it is important that the nurse should secure a specimen at the earliest opportunity.

Headache is one of the most frequent symptoms of the onset of fever. It may vary from a dull ache of slight character to an intense, persistent and almost unendurable pain. At times it may be of neuralgic type. The pain is usually in the forehead or temples; more rarely it occurs in the top or back of the head. As the disease progresses it is likely to abate in violence.

Pains in the back and limbs and in the bones often are associated with the headache and also may vary in intensity from a mere discomfort to the severe pain in the back associated with smallpox or the marked bone-ache of epidemic influenza.

Dizziness or vertigo often exists during the inception of febrile disease. This is increased when the patient stands and is much relieved by the recumbent position. Patients recovering from fevers of protracted length frequently are subject to dizziness due to weakness.

Mental symptoms are very common manifestations during fevers. These vary from mere dulness, listless-

ness, apathy and indisposition to mental exertion to extremes of delirium or even absolute coma. These symptoms differ with the temperament of the individual; intellectual persons and those who, in their daily occupations, are accustomed to use the mental rather than the physical faculties, are most likely to suffer from disturbances of this character. Naturally the type and severity of the disease influence to a marked extent the degree of mental disturbance. Extremes of mental disorder generally manifest themselves when the disease is otherwise at its worst.

Delirium is not unusual in severe fevers and may, though rarely, exist from the onset of the disease. More commonly it occurs later and varies in degree; it may be mild and appear only at night, it may be of quiet type or very violent, noisy, and so marked that restraint is necessary to control the patient. In other cases the delirium may be of the low, muttering type. When this occurs the patient lies quietly with his eyes open or closed, in a sort of half-waking state; he mutters incoherently to himself in a low tone, taking no cognizance of what is happening about him, and perhaps picks at the bed clothing or grasps at imaginary objects. He will respond sluggishly to a loud question and to active sensory impressions (a pinch or pin prick). He may make short replies, but relapses into his stupor, which may be troubled by dream-like hallucinations. These may disturb him even while he is in a half-waking con-

dition. While in this state restraint is unnecessary but the nurse's vigilance must not for an instant be relaxed for at any moment aggressive delirium of alarming character may appear. Habitual users of alcohol are likely, especially during the fever of pneumonia, to develop delirium tremens. Delirium of this type may attack even those who are unaccustomed to alcohol. Under this condition the patient talks constantly and incoherently. He is in motion continuously, there is marked muscular tremor and he is unable to sleep; he often shouts aloud, and frequently desires to rise, go out and attend to his work; visual and auditory hallucinations develop and he may see various imaginary objects, especially animals, such as rats, snakes or insects and think that they are creeping about the bed.

Delirium may pass on into stupor, a condition in which the patient lies quietly in a partially unconscious state, from which he may be aroused with some difficulty, but into which he slips again when the attempt to awaken him is discontinued, or a condition termed *coma vigil* may result. This is an unconscious state in which the patient lies with eyes open, but entirely oblivious to all going on about him; he neither realizes nor can he express his desires, he mutters constantly, his lips and tongue tremble and there are twitchings of his fingers and wrists (*subsultus tendinum*) due to the convulsive jerkings of their tendons; he picks at the bed clothing and grasps at invisible objects. Such con-

ditions as these may gradually disappear as the patient progresses toward recovery or absolute coma may supervene. This is a condition of entire insensibility, from which it is impossible to rouse him; he lies practically motionless, is unable to swallow and passes feces and urine involuntarily. Such a state is usually, although not invariably, a precursor of death.

Hiccough (singultus) is at times an obstinate symptom of fever. It is occasioned by a spasmodic contraction of the muscles of the diaphragm and may continue, despite energetic treatment, for considerable periods of time.

Symptoms Referable to the Special Senses—*Taste.*

—In fever the sense of taste is rendered less acute, perverted, or, exceptionally, wholly lost. Nothing tastes good, thirst is increased, water is always acceptable, and sour-tasting foods and drinks are preferred to sweet.

Smell.—The sense of smell is frequently blunted owing to the catarrhal inflammation of the nasal mucous membrane which may accompany fever. Especially in typhoid fever, nose-bleed may be an early symptom.

Hearing.—Hearing may be impaired, but is more usually rendered abnormally acute; there are often noises and ringing in the ears. Deafness is exceptional. The infectious fevers may be complicated by inflammations of the middle ear. In such cases there is earache, which is lessened if the inflammation goes on to per-

foration of the drum-membrane. When this takes place a discharge usually appears, at first thin, yellowish and perhaps bloody. Later it becomes thicker in consistency and often foul.

Sight.—There is often a dread of bright light (*photophobia*) and vision is less acute than normal. Usually early in fevers the pupils are dilated; later there is no fixed rule for their condition. The lining of the lids frequently is inflamed; its secretion is at first increased but later diminished, causing dryness. At times the lids may be gummed together.

Fever is always accompanied by an increase of tissue waste, consequently emaciation to a greater or less degree is an inevitable result. This is all the more marked since, in addition to the tissue waste, there is disinclination on the part of the patient to eat and probably inability on the part of the digestive and assimilative powers to supply the increased need of bodily nourishment.

CHAPTER II.

FEVER (Continued).

Diagnosis: The Thermometer: Scales of Thermometry: The Taking of Temperatures: The Pulse: The Respiration: Temperature Charts.

Diagnosis of Fever.—Fever being defined as an abnormal degree of bodily heat its diagnosis resolves itself into the measuring of the temperature of the body. It is customary as well to note, at the same time, the number per minute and character of the pulse beats and respirations. The height of bodily temperature is measured by means of the clinical thermometer.



CLINICAL THERMOMETER.

This little instrument is a form of maximum thermometer; that is to say an instrument so constructed that when its column of mercury reaches a certain height it remains there until displaced by jarring or shaking. The object of this is to give the observer sufficient time for accurate reading. Some clinical thermometers are provided with a curved surface which magnifies the column of mercury so that it is more

easily read than in instruments not so constructed. Thermometers registering in one minute or less may be purchased, but in hospitals those requiring from two to five minutes are usually employed, since they are less expensive.

There are in use at the present time three scales of thermometry, the *Fahrenheit*, the *Centigrade* and the *Réaumur*. The differences in these are as follows: They are all based upon the freezing and boiling points of water, the Fahrenheit scale taking 32° as the former and 212° as the latter, the Centigrade scale, 0° and 100° , and the Réaumur scale 0° and 80° . A table of comparisons of these scales is appended.

Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.
116	46.7	37.3	86	30	24
114	45.6	36.4	84	28.9	23.1
112	44.4	35.6	82	27.8	22.2
110	43.3	34.7	80	26.7	21.3
108	42.2	33.8	78	25.6	20.4
106	41.1	32.9	76	24.4	19.6
104	40	32	74	23.3	18.7
102	38.9	31.1	72	22.2	17.8
100	37.8	30.2	70	21.1	16.9
98	36.7	29.3	68	20	15
96	35.6	28.4	66	18.9	15.1
94	34.4	27.6	64	17.8	14.2
92	33.3	26.7	62	16.7	13.3
90	32.2	25.8	60	15.6	12.4
88	31.1	24.9			

Only the two former scales are in common use, the Fahrenheit in America and England, the Centigrade upon the continent of Europe; however, many physi-

cians in the United States prefer to use the latter scale. Certain rules may be formulated for the conversion of one scale into the other; for instance to convert a Fahrenheit reading into a Centigrade one subtracts 32, multiplies by 5 and divides by 9. To reduce a Centigrade into a Fahrenheit, one multiplies by 9, divides by 5 and adds 32. Examples:

$$98.6^{\circ} \text{ F.} = (98.6 - 32 \times 5 \div 9) = 37.0^{\circ} \text{ C.}$$

$$37^{\circ} \text{ C.} = (37 \times 9 \div 5 + 32) = 98.6^{\circ} \text{ F.}$$

In the text of this volume the Fahrenheit scale will be used with the Centigrade equivalent following in parentheses.

The index upon a clinical thermometer usually reads from 95° F. (35° C.) to 110° F. (43.3° C.) or 112° F. (44.4° C.), and each degree is divided into fifths so that one accustomed to the use of the instrument may easily read as closely as to the tenth of a degree.

With use the accuracy of clinical thermometers becomes somewhat impaired, owing to the action of differences in temperature upon the glass; consequently it is wise from time to time to have them compared with a standard instrument. This may be done by holding both thermometers in a vessel of warm water and noting the difference in registration if any exist.

In private practice each nurse should be supplied with two thermometers, to provide against breakage; it is wise to keep one of these for mouth and the other

for rectal temperatures. In hospitals, especially in contagious disease wards, there should be a thermometer for each patient, and the nurses should take great care not to break the instruments as in a large institution the cost of the thermometer supply is by no means a small item. When not in use they should be kept in a small vessel, a tumbler for example, filled with an antiseptic solution (5% carbolic acid or 1 to 5000 mercury bichlorid). The bottom of the vessel should be covered with a layer of absorbent cotton. Recently it has become possible to purchase thermometers in air-tight cases which may be filled with an antiseptic solution. The appliance is one to be recommended to those who carry the instrument in bag or pocket.

Bodily temperature may be measured in the mouth, the axilla, the groin, the rectum or the vagina. In ordinary practice the mouth or axilla is usually used. The temperature varies within small limits depending upon the situation employed as the following table indicates:

Axilla (groin).....	98.4°F. (36.9°C.)
Mouth	98.6°F. (37 °C.)
Rectum (vagina).....	99.5°F. (37.5°C.)

Before and after taking the temperature in any of these situations the thermometer should be washed in clean *cold* water, and the column of mercury shaken down as low as 95° F. (35° C.). If the mouth is to be used, the nurse should make sure that no hot or cold

substance has been eaten or drunk for some time previously. The patient should be told to keep the instrument upon the floor of the mouth underneath the tongue, to hold the lips tightly closed, lest outside air enter, and to breathe gently through the nose. If the thermometer is broken in the mouth and pieces are swallowed the physician should be notified immediately, although no bad results are likely to ensue.

In using the axilla, the part should be wiped with a moist sponge or cloth, and then thoroughly dried with a towel. The bulb of the instrument should be placed in the deepest part of the arm-pit, the arm pressed close to the side and the forearm folded across the chest with the hand upon the opposite shoulder. The nurse must hold the limb in this position while the thermometer is in place.

When taking the temperature in the rectum care should be taken that the bowel is empty, for if the thermometer does not come in direct contact with the mucous membrane it will not register the correct bodily temperature. The instrument should be lubricated with vaselin or other like substance, the buttocks gently separated with the fingers of one hand while the bulb of the thermometer is inserted through the anal opening for from one and a half to two inches. In struggling children and in delirious patients the nurse must take great care lest the instrument be broken within the bowel. In taking the temperature in the vagina the

technique is practically the same as when the rectum is used.

Taking the temperature in the groin is seldom necessary and the results are less accurate than in any of the other situations.

It is wise to allow the thermometer to remain in place at least five minutes so as to be certain of accurate registration. When there is local inflammation in or near the axilla, the mouth or the rectum, the local heat is increased over that of the rest of the body, consequently in such case an unaffected part should be used in measuring the bodily temperature.

In every febrile condition the temperature should be taken at least twice during the twenty-four hours. Since the temperatures of the morning and evening indicate most exactly the progress and severity of the disease, these are the most appropriate times. In diseases of severe type it is customary for the physician to order the temperature taken every six, four or three hours as he may deem necessary. Usually it is unwise to waken a patient in order to take his temperature, for the benefit derived from the sleep is likely to exceed that accruing from learning his temperature, but at times it may become necessary to take the temperature at the stated intervals at all hazards. Judgment on this point is, of course, left with the physician.

The Pulse.—In taking the pulse two factors must be considered, first, its frequency; second, its quality.

The frequency of the pulse is affected by the same influences which affect bodily temperature (see p. 13). It also differs in different individuals under the same conditions. One person in health may have a pulse as slow as 50 to 60 beats to the minute while another's may beat 80 to 90. Age and sex influence the pulse-rate as the following table shows:

Normal pulse in children...	90-100 beats per minute
Normal pulse in adult males.	60- 75 beats per minute
Normal pulse in adult females	65- 80 beats per minute

In noticing the quality of the pulse the following points must be considered:

- (a) Regularity or irregularity.
- (b) Whether intermittency be present.
- (c) The size of the artery.
- (d) The character of the pulse wave.
 - 1. Whether the rise be quick or slow.
 - 2. Whether the fall be quick or slow.
 - 3. Whether dicrotism be present.
- (e) The tension of the artery wall.
- (f) Whether the artery wall be abnormally thick.

A pulse may be irregular in frequency, in force, or in both these elements.

An intermittent pulse is one which drops a beat from time to time.

The pulse wave as it is felt by the finger of the observer may rise and fall with varying degrees of

rapidity. A dicrotic pulse is one in which two distinct beats are felt for each pulsation of the heart. The first and greater of these is the true pulse beat and care should be exercised on the part of the nurse not to count the second and weaker impulse. In cases where it is difficult to distinguish the true beat from the false one hand should be placed on the chest over the heart's apex. When this is done the dicrotic pulse may be counted with ease and correctness. In this type of pulse, which occurs only when arterial tension is low, the second wave is due not to a contraction of the heart, but to the closure of the aortic valves.

The tension of the artery wall depends upon two factors: Whether the muscular coat of the artery be contracted and whether the vessel be fully distended with blood. A pulse of high tension is not easily compressible by the finger and its condition is analogous to that of a rubber tube filled with water under heavy pressure.

Thickening of the artery wall is determined by pressing the vessel so as to empty it of blood and then trying to roll it under the finger tips. If the empty vessel is more than slightly perceptible its wall may be considered as thickened. Thickness differs in degree from bare perceptibility to such marked thickening that the vessel feels like a pipe stem under the skin.

The normal pulse is perfectly regular in force and frequency, the artery is of medium size, its rise and

fall are gradual, its tension is only moderate and the vessel wall is not thickened.

Under normal conditions some individuals have an intermittent pulse, but such a condition is not a frequent occurrence.

Impairment of the strength of the pulse, increase in its rapidity, intermittency and dicrotism are indications of heart weakness and are not unusual manifestations in febrile disease.

The nurse should be watchful of the effects upon the pulse of various therapeutic measures such as baths and the different drugs. In disease pulse and temperature bear an important relation to one another, pulse frequency being increased as a rise in temperature takes place; any disturbance of this ratio should be carefully noted by the attendant, since it may be an indication of heart weakness.

In taking the pulse the radial artery in the wrist is the usual site for the procedure, although at times the carotid or temporal arteries may be found more convenient. The nurse should accustom herself always to use the same fingers—usually the index and middle fingers of the right hand, because continued practice will result in extreme delicacy of touch. The pulse should be counted for at least one minute so as to insure accuracy.

The Respiration.—In taking the respiration of a fever patient, as in taking the pulse, frequency and char-

acter are the elements to be noted. Normally the number of respirations per minute in the adult is in the neighborhood of eighteen, or one to about every four pulse-beats. The rapidity of respiration varies, as does that of the pulse, at different periods of life.

Respirations in the infant.....	30-35 per minute
Respirations in the child from	
five to eight years.....	20-25 per minute
Respirations after eight years	
of age.....	18-20 per minute

The normal pulse-respiration ratio may be modified in disease. In fevers without lung involvement the pulse usually undergoes a greater relative increase than do the respirations, while in cases in which the lungs are affected, the reverse of this rule is the usual condition.

In observing the respirations the following characteristics should be noted:

- (a) Their frequency.
- (b) Their regularity.
- (c) Their depth.
- (d) Whether they be quiet or stertorous.
- (e) Whether they be abdominal or thoracic.

Stertorous respiration is breathing accompanied by a sound resembling snoring.

In children and adult males respiration is normally abdominal, that is to say the abdomen rises and falls upon inspiration and expiration rather than the chest, while in adult females thoracic respiration—breathing in which chest movement is more marked—is the rule.

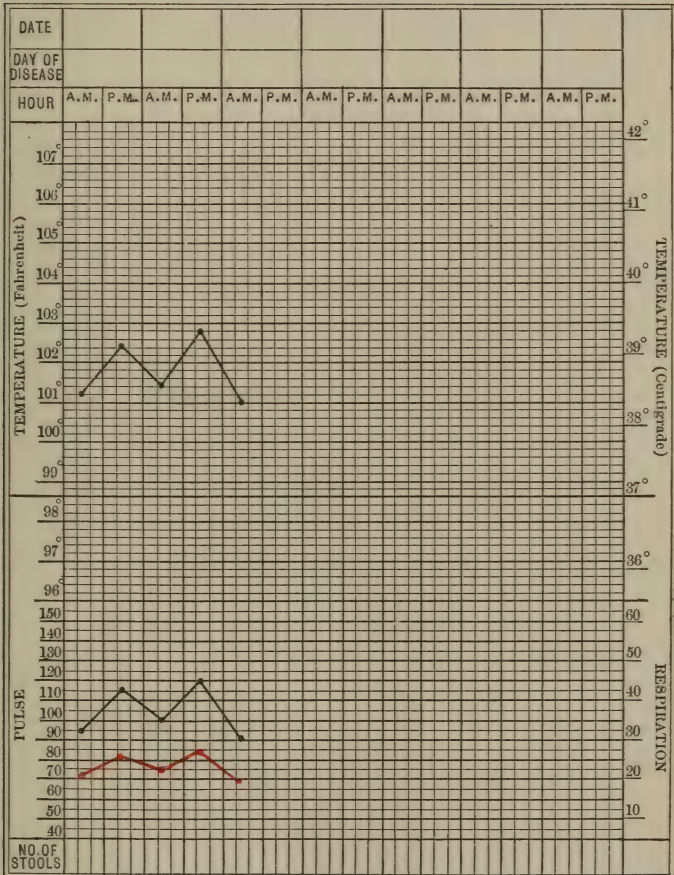
While taking the respiration the nurse should not allow the patient to know what is being done, for this knowledge is likely to have such a mental effect as to influence the depth and rapidity of the breathing. Usually the respiration can be counted by watching the rise and fall of the chest or abdomen of the patient without his cognizance. In order to insure an accurate record the respirations should be counted for at least one minute.

In children the act of crying frequently renders it quite impossible to estimate the respirations with any degree of accuracy.

For recording the temperature, pulse and respiration printed or ruled charts are used which not only show at a glance the course of the disease in regard to these factors, but are valuable afterwards as documents of reference. Such a chart is depicted upon the opposite page. The method of recording the temperature, pulse and respiration is as follows: Suppose the patient is first observed in the morning and his temperature is 101.2° F. (38.5° C.), his pulse 95 beats per minute, and his respirations 20 per minute; dots are made upon the chart in the proper places. In the evening his temperature is found to be 102.4° F. (39.1° C.), his pulse 115 and his respirations 25; dots are again made in the column for afternoon records and lines are drawn connecting these with those of the morning. The next day the process is repeated, and so

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Name _____ Age _____ Sex _____ Diagnosis _____ Case No. _____



[illegible]

on. When the records are taken more often the method is the same, the chart being so arranged as to make the recording of the patient's condition every four hours very simple. Upon the right side of the chart will be found Centigrade and respiration scales. It is well to chart the night temperature curve and the respiration curve in red ink. The spaces for date, day of disease and number of stools will explain themselves.

Upon the back of the chart will be found spaces for recording the urine examinations, the medication, the diet, etc. It is suggested that the notes for the night be made in red ink.

CHAPTER III.

FEVER (Continued).

General Treatment: Hydrotherapy: Treatment of Special Symptoms: Feeding: Beverages: Diet in Convalescence: Diet-list.

General Treatment of Fever.—At the first indication of febrile disease, the patient should be put to bed and strict quiet enjoined. The problems that confront us in the management of such a patient are two; first the removal of the cause and underlying factors so far as this is possible, and second the restoration of proper metabolism, the abnormal condition of which is shown by the various derangements of the bodily functions which are a part of the clinical picture.

Frequently very little can be done to remove the cause of a fever, as this is self-limiting and its results are impossible of abortion or shortening; however, unless there exist some contraindication we may be able to lessen the effects of this cause by inducing elimination through various channels. This may be done by causing emesis, free movements of the bowels, increasing the quantity of urine, stimulating the action of the skin so as to induce free sweating, or by rectal irri-

gation. The poison circulating in the blood may be rendered less harmful by the introduction of warm salt solution (0.7%) under the skin or directly into the blood stream through an opening into a vein.

By emesis irritating substances will be removed from the stomach and further infection by this route prevented, and the absorption of poisons through the stomach wall will be stopped. Free purgation will act in like manner upon the intestinal tract and also perhaps aid in removing toxic substances from the blood. The induction of free action of the skin and kidneys leads to a like effect, and the high rectal irrigations, the injection of salt solution under the skin or directly into the circulation not only dilute the poisons but will hasten their elimination through the various channels and act as stimulants of considerable power upon the weakened system.

By these means we may, very rarely, remove the primary cause of the disease; when this is impossible we may lessen the severity of the process and accomplish much toward the restoration of normal metabolism and the correction of the disturbed body functions.

In the less severe febrile diseases the abnormal temperature, which may run from 101° F. (38.3° C.) in the morning to 103° F. (39.4° C.) in the afternoon, needs no special attention. When high temperature persists and is of itself manifestly a menace to the

patient, measures must be taken to mitigate it. This may be done:

(a) By drugs. The various so-called antipyretics, phenacetin, acetanilid, antipyrin, etc., may be employed, but their use may be attended by bad effects, especially upon the heart, and their administration is fast passing out of vogue. Patients to whom these drugs are given must be carefully watched by the nurse for signs of heart-weakness. The fall of temperature following their use may be accompanied by various signs of prostration which will necessitate warm covering, the use of hot-water bottles and perhaps the administration of whiskey, aromatic spirit of ammonia or other stimulant. Consequently the reduction of fever by drugging is to be attempted with the greatest care if at all.

(b) Much more advisable is the control of high temperature by means of cold applied externally. This may be done in various ways as follows:

1. *The Cool Tub Bath.*—This necessitates at least two attendants, for the patient must be lifted into the tub, which should be placed at the patient's bedside. It should contain water enough to cover the patient to the neck, the head should be supported upon a rubber air pillow attached to the edge of the bath tub and his comfort will be augmented by placing a rubber air cushion beneath the buttocks. The temperature of the water may be varied within wide limits, but may not be lower than 59° F. (15° C.). If the cold water is dis-

agreeable the bath may be begun at a temperature of 90° F. (32.2° C.) and cold water gradually added until the temperature is reduced as low as required. It is better, however, to use cold water from the beginning for the effect sought is a reaction and for this a certain amount of shock is necessary. The patient, wearing swimming trunks or covered with a sheet, should be gently lifted by two attendants and lowered into the water. Cold water—60° F. (15° C.) or less—should be poured over the head or a frequently changed cool compress should be applied to the forehead. The cold water may be applied to the head by means of a current from an ordinary irrigating apparatus. Vigorous rubbing of the body by the hands of the attendants throughout the bath is an absolute necessity. The bath should last from ten to twenty minutes according to the reactive power of the patient. At the end of the procedure the patient should be lifted out of the tub and placed in bed, the water having been allowed to drain off for a few seconds to prevent wetting the blankets. Now being wrapped in the blankets he should be thoroughly dried by rubbing. If the patient shows signs of poor reaction while in the bath such as blueness of the lips and extremities or decided shivering or if the effect upon the heart is untoward the duration of the bath should be lessened. In most patients chattering of the teeth may be disregarded, and cyanosis of the extremities alone need not be considered sufficient

reason for stopping the bath, but if marked blueness of the face, especially about the nose, is noticed the patient should be immediately taken from the water. The patient's temperature is useful as an indication of the effect and for the necessity of a repetition of the procedure. It is a great mistake to endeavor to lower the pyrexia as much as possible. Before the patient is put into the bath and after he is taken out it is usual to administer a glass of wine, a half ounce of whiskey, a half to one drachm of the aromatic spirit of ammonia, diluted, or a small cup of hot coffee as the physician may direct. During the bath a glass of cold water may be allowed.

The patient's reactive powers may be measured by a tentative bath lasting five minutes at 90° reduced to 80° F. (32°-27° C.) and the initial temperature, the reduction and the length of the following bath may be determined accordingly. If possible the physician should be present during the bath, both to guard against the possibility of shock and to make sure that the good effects of the procedure are not lessened by too early termination of the bath.

If the cold tub is not well borne by the patient lukewarm baths given in the same manner are often followed by good results. The procedure may bring about a drop in temperature of from one to four degrees (F.), but it is wise not to allow a reduction of more than two degrees (F.) (one degree C.).

In private practice an ordinary tin bath tub from five to six feet long, which may be purchased at the plumber's, is convenient. The stationary bath tub, for obvious reasons, should never be used. In hospitals tubs upon wheels are usually provided.

Fresh water should be used for every bath.

The preparation of the bed for the reception of the patient is of the utmost importance. All should be ready before the beginning of the procedure, so that there may be no delay if it become necessary to terminate the bath sooner than was expected. Two warm blankets should be provided and several hot-water bags as well, and an ice cap should be ready for the head. Over the lower blanket should be placed a warmed sheet upon which the patient should be laid on being lifted from the tub. The sheet should then be wrapped about him and tucked between the arms and the body and between the legs, so that no two skin surfaces shall come in contact. The patient is thoroughly dried by being rubbed outside the sheet. This is then removed and he is allowed to lie between the blankets with the hot-water bottles at his feet and against his legs and the ice cap upon his head. The lowering of the temperature is not the only good effect produced by this measure; it is also a stimulant to the nervous and circulatory systems.

2. *The Bed or Slush Bath.*—This is a less drastic method than the tub bath and many patients to whom

the cold bath is almost unendurable bear it well and are very favorably affected by it. It is given upon a bed around the edges of which rolled blankets have been placed so as to form a sort of wall. Over this is placed a rubber sheet or piece of table oil cloth and into the trough thus formed several pails of water are poured. The patient is placed in this and treated just as when the tub bath is employed. The bed bath may be constructed also by passing a piece of clothes line around the head and foot of the bed, connecting these by two parallel ropes and throwing over the whole an oil cloth which is attached to the rope by clothes pins; or a rectangular fence about eight inches in height and slightly smaller than the mattress may be constructed over which a rubber sheet may be thrown. The water from these improvised tubs is best drawn off by a siphon made of a few feet of rubber hose.

3. *The Sponge Bath.*—For this measure the water may be of various temperatures as indicated; often the addition to it of a little alcohol is very grateful to the patient. An ice cloth should be applied to the head, a sponge or soft cloth is saturated just sufficiently to leave a thin film of moisture upon the skin which cools the patient by rapid evaporation and does not wet the bed clothing, and with this sponge the patient is thoroughly rubbed, while the other hand is performing friction, and then dried, one part at a time. Care must be taken to keep the portions of the body, not being

sponged, covered. Particular attention should be given the back, for here the tissues retain the heat longest. Proper reaction is evidenced by redness of the skin. No such effect is produced upon the temperature by sponging as by tubbing, nevertheless the fever may be slightly lowered. The chief good accomplished is its favorable action upon the skin and the great comfort which it affords the patient.

4. *The Sprinkle Bath*.—As a method for the reduction of temperature this may be considered to rival the tub bath. It has the advantages of being better borne by many patients and of peculiar adaptation to private practice. The technique is as follows: The head of the bed should be raised about ten inches from the floor, and, to keep the mattress from sagging, under it should be placed crosswise several pine boards as long as the width of the bed. The mattress should be covered with a rubber sheet upon which a pillow and ordinary sheet should be adjusted. The patient should be stripped and sprinkled with water of the desired temperature from an ordinary watering pot or from an irrigating apparatus to the tube of which a sprinkling nozzle is attached. The water as it flows from the foot of the bed should be received in a large dish pan or foot bath and can be used over and over, the proper temperature being maintained by the addition of ice. The water should not be poured from too great a height, and should be applied chiefly to the abdomen and legs.

Rubbing with the hands should be kept up throughout the procedure and otherwise the patient should be dealt with exactly as in tub bathing.

5. *The Sheet Bath*.—A sheet wet with water at 80° F. (27° C.) is placed upon blankets on a bed or table and the patient with arms raised above his head is tightly wrapped in it. Water is now poured upon the successive parts of the body which are then rubbed with the hand until warm and then cooled by means of colder water. When an area ceases to become warm another part is attacked in like manner, and so forth until the whole body has been subjected to the procedure.

6. *The Towel Bath*.—The patient being undressed and laid upon a blanket, a thoroughly wet towel is placed smoothly over the back; rubbing is employed over this until it becomes warm. Then water is poured over the surface till it cools, friction is again employed and the process repeated till the warmth ceases to return. The buttocks are next treated in like manner, and the back having been dried, the anterior surface receives the same treatment.

7. *The Ice Rub*.—This consists simply in rubbing the surface of the body with flat pieces of ice covered with gauze. The various parts of the body are treated one after another until they are cooled. The patient is then dried and properly covered. In excessively

high temperatures the ice rub may be employed while the patient is in a tub bath.

8. *The Ice Pack*.—The patient being stripped is laid upon a bed covered with a rubber sheet. An ice cap is applied to his head. Flat pieces of ice are arranged along the sides of the body, in the armpits and between the legs, and the body is rubbed with pieces of ice just as in the ice rub. The ice may be in direct contact with the skin or wet cloths may be interposed.

9. *Ice Bags, Compresses and Coils*.—Ice bags are frequently used for the local application of cold. These are rubber bags of various shapes and sizes, being adapted in these respects to the portions of the body to which they are to be applied, and are fitted with screw caps. When in use they should be about three quarters filled with ice broken into pieces the size of the end of the thumb. As little air as possible should be allowed in the bag.

Ice compresses are made by crushing the ice and spreading a layer of it between two folds of blanket or towel, preferably the latter as it will absorb the meltings while the former will not. These compresses may be made of considerable size and applied over large areas but their use has the extreme disadvantage that it is almost impossible during their employment to keep the bed and clothing dry.

Cold compresses, while they do not affect the bodily temperature, often give the patient great comfort espe-

cially when applied to local areas of pain. They are made of several layers of any cloth which will absorb and hold moisture, wrung out of water at the required temperature and applied. They may be renewed as often as is necessary and it is well to have two in use at the same time, or they may be allowed to remain in contact with the patient continually, the water lost by evaporation being supplied from time to time.

Ice coils of rubber tubing arranged in various shapes to fit the different parts of the body are often used to reduce the heat of local inflammation. Water at the proper temperature is caused to run through the tubing by siphonage, the vessel from which it runs being placed above the patient, that into which it is discharged, on the floor. Care should be taken that the former does not become exhausted. An ice coil may be made at home from ordinary flexible rubber tubing about twelve yards of which are necessary. Tubing should be coiled into circular, oval or rectangular form, depending upon the part to which the application is to be made. From the beginning and end of the tubing four to six feet should be left free and the coil itself be sewed to a piece of rubber sheeting.

10. *Ice-water Enemata*.—These often cause a considerable fall in temperature, reaching as they do to the “heat-citadel” of the body. Hare has found that enemata of 65° F. (18.3° C.) lowered the bodily temperature 3° F. (1.5° C.) in thirty minutes. They

should be given by a fountain syringe, never through a Davidson syringe, as the bowel has been ruptured by this instrument owing to the sudden increase of pressure attendant upon squeezing the bulb. The soft-rubber rectal tube passed as far as possible into the bowel is preferable to the hard-rubber nozzle. The usual quantity of water injected is from one to two quarts, a return flow being allowed as the fluid passes in.

In using any of the above methods for the reduction of temperature the greatest watchfulness of the patient's condition should be observed and any tendency to collapse as evidenced by distress, weakening of the pulse, coldness of the extremities and blueness of the lips should cause the nurse to notify the physician immediately and to institute prompt restorative measures such as the administration of whiskey, brandy or the aromatic spirit of ammonia, rubbing the hands and feet, hot-water bottles to the extremities and over the heart and elevation of the foot of the bed.

If hyperpyrexia occur in the absence of the physician it is the duty of the nurse to meet the emergency by the application of cold compresses and by cold sponging, in the meantime preparing an ice-water enema and cold tub bath pending the arrival of the medical attendant.

The Treatment of Symptoms Referable to the Skin.—At the onset of a febrile disease it is often wise

to induce free perspiration by the use of hot-water bottles, blankets, etc. During the course of the illness the patient's skin should be kept clean by a daily bath with warm water and soap. Dryness and harshness of the skin may be relieved by anointing the body with albolene or olive oil. Scales and pieces of epidermis that are cast off during and after contagious fevers should always be destroyed, preferably by burning, as they may become sources of further infection. Special attention should be given the points where bed-sores are likely to form, namely the backs of the heels and over the buttocks and sacrum. The sheets must be kept smooth and the bed thoroughly clean and free from crumbs, moisture and contamination from the discharges from the rectum and bladder. The chief consideration is to prevent the beginning of bed-sores by the strictest cleanliness, in addition to which measures to improve and harden the skin of the susceptible parts should be employed. To insure a good blood supply to these parts the patient should be turned upon his side several times a day and the skin of the back thoroughly rubbed with a dry towel and dusted with talcum powder. Applications rubbed into the skin to harden it, such as salt two drachms to whiskey one pint or a dilute solution of lead subacetate may be employed. When the skin becomes red and irritated but is still unbroken it should be painted with a solution of silver nitrate, twenty grains to one ounce of water. When

a bed-sore has appeared, with the object of preventing its spread and of accelerating its cure the patient must be so placed as to take all weight from the affected part. This may be accomplished by the use of an inflatable rubber bed ring. The sore itself must be kept clean by being swabbed with 1 to 5,000 mercury bichlorid solution and dusted with iodoform powder. A dressing of gauze on which zinc oxid ointment has been spread should be applied. In advanced cases the use of the water bed may become necessary. If the sore spreads and burrows through the surrounding parts free opening and thorough irrigation are indicated.

The Treatment of Symptoms Referable to the Mucous Membranes.—Dry and cracked lips may be made more comfortable by gentle rubbing with albolene or cold cream. For the immediate relief of thirst, water, cracked ice and acidulated drinks may be given as often as desired; a drink consisting of glycerin one drachm, boric acid half a drachm to the tumblerful of water may be found acceptable. The mouth should be kept sweet and clean by the employment of regular and frequent washings with dilute listerine, tincture of myrrh, etc. A very useful formula consists of equal parts of listerine, hydrogen peroxid solution, lime water and water. The nurse should be careful to see that the mouth is washed after each drink of milk. There is no counter indication to the use of the tooth brush. Sordes and coatings upon the tongue may be removed by swabs

moistened in one of the above-mentioned solutions. A convenient tongue-scraper may be made of a piece of whale bone bent into a loop. In cases where the tongue is extremely dry, the "tongue-bath" often affords much relief. This consists simply in holding the mouth full of fluid for several moments. In this way considerable moisture is absorbed by the mucous membranes.

The Treatment of Symptoms Referable to the Digestive Organs.—The nausea and vomiting may be relieved by restriction of diet and by the administration of cracked ice. All vomited matter should be carefully inspected by the nurse and if it is unusual in appearance should be kept for examination by the physician. Excessive distention of the stomach or bowels by gas may be relieved by the application of hot compresses; by turpentine stupes which are prepared by wringing out a flannel in hot water, sprinkling upon its surface two or three teaspoonfuls of turpentine, wringing it again and immediately applying it to the abdomen; if marked redness and irritation are caused the stupe should be at once removed and the skin anointed with albolene or olive oil; by the insertion of a rectal tube through which the gas may be passed; or perhaps best of all by the administration of a high rectal irrigation of a warm salt solution (one drachm to the pint).

At the beginning of a fever the bowels should be opened by repeated small doses of calomel (one tenth

to one fourth of a grain every half hour to six doses) followed by a saline. During the course of the disease a daily movement of the bowels should be secured by this means, by other laxatives or by enemata of warm soapsuds.

The Treatment of Symptoms Referable to the Circulatory System.—The pulse in fever should be studiously watched by the nurse and any marked change in its character reported at once to the physician, since by noting its action a fairly reliable estimate of the patient's general condition can usually be made. In severe cases heart weakness may call for various stimulants such as whiskey. In extreme cases this may be administered hypodermatically and in cases of collapse hypodermatic injections of camphor and ether or camphor and olive oil may be given, when directed by the physician, with good effect.

The Treatment of Symptoms Referable to the Respiratory System.—The dry, irritating cough caused by tickling in the throat may often be relieved by a drink of water or milk or by the employment of a simple jujube troche or gum drop. Various expectorant and sedative drugs are used in the cough which accompanies involvement of the lungs. If the cough is so frequent and severe as to cause soreness of the chest this may be lessened by the application of hot compresses or by rubbing with various liniments.

The Treatment of Symptoms Referable to the Urinary System.—The urine should be carefully examined by the nurse as to color and sediment and its daily quantity noted; when bidden she should save bottled and labeled specimens for the physician. Such a specimen to be of any diagnostic value should be a portion of the mixed urine of an entire twenty-four hours. Four ounces are, as a rule, a sufficient quantity; it is important that the bottle should be clean. Freer action of the kidneys may be secured and the urine rendered less irritating by the administration of a saline diuretic, preferably perhaps in the form of “cream of tartar (potassium bitartrate) lemonade.” This is prepared by dissolving one and one half drachms of cream of tartar in a pint of boiling water. Allow this to cool and flavor with a little lemon juice or peel, add a little ice and sweeten with sugar. This is a very palatable drink and may be taken *ad libitum*. When the urine is much diminished in quantity, or retention (a rare occurrence) is present, an increased flow of urine may be induced by hot applications over the kidneys or a high rectal irrigation of hot salt solution. In certain infectious diseases, notably typhoid fever, the urine is capable of transmitting the infection, consequently it should be handled with the greatest care and disinfected properly before being disposed of (see p. 85).

Seeming retention of the urine may be treated as above. Nervous patients who experience difficulty in voiding urine while in the recumbent position may be aided in starting the flow by hearing the sound of running water or by having warm water poured over the pubes. When obstinate retention occurs and the patient is entirely unable to void the urine, catheterization must be practiced. This may be done by the nurse upon the physician's order. Soft-rubber catheters are preferable for males and glass instruments for females. The greatest care is necessary to keep these absolutely clean, for unless this is done infection may be carried into the bladder and cystitis result; such an accident should never happen and when it does is due to carelessness in the care of the catheters, to lack of cleanliness of the hands of the person who performs the operation or faulty technique in cleansing the patient's urethral orifice. Catheters should be boiled after using and kept in a 1 to 5000 solution of mercury bichlorid. Before passing a catheter the hands should be sterilized, the orifice of the urethra cleaned with cotton wet with 1 to 5000 solution of bichlorid and the instrument lubricated with sterile albolene or olive oil. It is wise to attach about a foot of rubber tubing to the open end of the glass catheter so as to guard against its passing entirely into the bladder and to lessen the chances of soiling the bed clothes with urine. When incontinence exists a soft-rubber urinal may be useful.

The Treatment of Symptoms Referable to the Nervous System.—The discomfort of the initial chill of febrile disease may be relieved by warm covering, hot-water bottles to the extremities, by rubbing the body and limbs with warm woollen cloths and by the administration of hot stimulant drinks. These measures are also applicable to the relief of chills occurring during the course of the disease. In children convulsions may be treated by hot baths—not over 105° F. (40.5° C.)—or by the administration of a few whiffs of chloroform from time to time. The passage of a stomach tube and the washing out of the organ or a rectal irrigation of warm saline solution will frequently cause a cessation of the convulsions.

During convulsions in the course of febrile disease the nurse must take care that the patient does himself no injury; beyond this the less he is restrained the better. Constricting clothing about neck or chest should be loosened to guard against interference with respiration. If there be movement of the lower jaw some object such as a spool or roller bandage should be placed between the teeth to prevent biting of the tongue.

The nurse by her manner can do much to lessen the irritability and discomfort of ordinary febrile disease. She should step quietly, talk little, notice everything and while not seeming officious to the least degree, anticipate every wish.

Headache may be lessened by cold or hot compresses to the seat of pain; sometimes the cold will prove more efficacious, sometimes the hot; that which affords most relief should be selected.

The pain in the back and limbs may be mitigated by hot-water bags, by massage or by rubbing with various embrocations. Dizziness is lessened by the recumbent position. When arising after a continued illness the patient should first be allowed to sit up in bed for an hour or two, a day or two later he may be helped to an easy chair for a short time, then short excursions around the room may be undertaken with the help of the nurse, until finally sufficient strength has been recovered so that he is able to walk alone.

The mental symptoms often are relieved by the use of cold as described above; when they take the form of active delirium various sedatives may be administered, as the bromids. Chloral, with morphin as a last resort, should only be given under the authority of the physician. If restraint is necessary, and in extremes of delirium the strength of several persons may be required to hold a vigorous patient, it is legitimate to use a folded sheet extending from armpits to groins, laid over the patient and fastened under the bed with strong safety pins. Restraint by means of tying the hands and feet to the bed posts is never necessary.

During the marked weakness of severe febrile diseases the patient should not be allowed to move him-

self in bed; this must be done for him by the nurse. While the patient is in such condition as to be unable to make his wants known to the attendants, the greatest care must be taken that he receive his nourishment in proper quantity and at regular intervals and especial watchfulness should be exercised lest the bladder become too full. Under these circumstances catheterization may become necessary.

Hiccough occasionally baffles all treatment. Cracked ice, a teaspoonful of salt and lemon juice or salt and vinegar, or a teaspoonful of raw whiskey may prove efficacious. Obstinate cases may respond to the antispasmodic drugs or the hypodermatic use of morphin when ordered by the physician. In certain cases the use of electricity may meet with success.

The Treatment of Symptoms Referable to the Organs of Special Sense.—The care of the tongue has been described in the section on mucous membranes.

The Nose.—The dryness and excoriations of the nostrils may be prevented by anointing these parts with albolene or olive oil and the crusts which collect inside the nose may be softened and removed by swabs fashioned from toothpicks and bits of cotton and dipped in any of the alkaline solutions mentioned below. The patient should be encouraged to blow his nose and additional cleanliness may be secured by the use of the hand-bulb atomizer filled with an alkaline spray solution such as listerine or glycothymoline diluted one part to

four or six of water. A necessary precaution in this process is not to allow the patient to blow his nose for some moments after the use of the spray, otherwise bits of the secretion may be forced into the eustachian tubes and inflammation of these and consequent middle ear disease may be caused.

The Ears.—The increased acuity of hearing which may be present in fevers may be rendered less distressing by insisting upon quiet in the house and especially in the sick-room. A ban should be put upon loud conversation, but attendants should converse in a low tone, since whispering frequently is extremely irritating to the patient. If there be much traffic about the house it is often wise to cause the pavements to be strewn with tan bark. The patient should be frequently questioned as to the presence of pain in the ear and such an occurrence should be immediately reported to the physician. Such pain may be relieved by hot applications to the organ, by poultices around (never over) it, or by careful syringing with warm water. It may become necessary to puncture the drum membrane in order to drain the tympanic cavity. This should be done only by the physician. When there is discharge from the auditory canal cleanliness may be attained by syringing or by mopping with small cotton swabs moistened in weak antiseptic solution.

The Eyes.—Increased sensitiveness to light may be rendered less annoying by screening the patient's bed.

This is preferable to darkening the apartment, for sunlight is a sick-room necessity. At night the room should be dimly lighted and the lamp so shaded that its rays do not fall directly upon the patient. If there is tendency to dryness of the eyelids these should be moistened with warm boric acid solution (full strength or half saturated). When there is tendency to increase of secretion and the lids stick together the same agent may be used or the edges of the lids lightly smeared with albolene or olive oil. The eyes should not be used during the illness and only to the slightest extent during convalescence. This is especially to be remembered in the care of cases of measles.

Feeding in Febrile Disease.—The diet of patients suffering from fever must be one consisting of food that will be easily digested and at the same time keep up the bodily nutrition. All food should be given in liquid form and should be of such character as to furnish as much nourishment for its volume as possible.

The objects to be attained in the dietetics of fever are:

(a) To supply nutriment sufficient to compensate for the tissue consumed.

(b) To give nourishment which will leave as little undigested residue as possible and which will not disturb the weakened organs of digestion.

In fevers with remissions of temperature it is best to give the largest amount of food while the temperature

is down, for at this time the digestive and assimilative powers are best able to do their work.

Milk, since it offers the greatest amount of nourishment for its volume, would seem the ideal food but it has its disadvantages. Of these the most important is that it is likely to coagulate in large curds in the stomach, which cause distress and are not easily acted upon by the juices of digestion. This fault may be obviated in various ways. The milk should be administered slowly so that if curds are formed, there will be a number of small ones rather than a single large one; by dilution with various carbonated waters or by partial predigestion by peptonization (for which peptonizing tubes and full directions may be obtained from the apothecary) the milk may be so prepared as to avoid disturbance from this cause. Kumyss (milk which has undergone alcoholic fermentation) or matzoon (milk which has undergone lactic acid fermentation) are well borne by many patients who object to or are distressed by plain milk.

After milk in nutritive value in fevers come the different liquid preparations of meat—meat juice, soups, broths and the like. Soups and broths contain much less nutriment than milk, but on account of the high temperature at which they are usually taken and on account of the salts which they contain, they possess certain stimulant properties which render them useful. Patients quickly tire of them, but by flavoring them

with the different vegetable extracts, celery, onion, and the like, they may be made less monotonous. The vegetable purées may be employed. These are prepared by thickening pure soups with powdered rice, arrowroot or flour.

In mild cases of fever and in those of only short duration with little digestive disorder, the patient may be allowed the various semi-solid foods such as oatmeal, arrowroot or barley gruel, milk toast, meat jelly, soft-boiled eggs and the like.

Many patients insist that they cannot take milk, but most of these will find out their error if the nurse will exercise tact and gentle persuasion. It may be rendered palatable in various ways—for instance by the addition of half an ounce of strong coffee to each glass, or in the form of junket, which may be flavored with a little sherry or nutmeg. Matzoon, kumyss and the various proprietary foods, malted milk, Mellin's food, etc., should be tried if milk really is impossible, and if these prove distasteful we must fall back upon the soups and gruels above mentioned. A diet of vegetable gruels alone will not provide sufficient nourishment, consequently these must be supplemented by egg-albumin, gelatin and broths. Eggs may be allowed; these are most digestible when raw or only slightly cooked. They may be taken beaten raw with milk, with or without a little brandy, or the yolk alone may be beaten with hot milk or water or with sweetened hot tea. The

eggs should never be boiled, but should be placed in water that has been boiling and allowed to stand for a quarter of an hour. This process cooks them slightly and an egg thus prepared may prove acceptable to patients to whom the idea of a raw egg is unpleasant.

Gelatin in meat, wine or fruit-juice jelly or in the form of blanc-mange, which may be variously flavored, is often agreeable. These jellies must be given in connection with other foods, as they contain little nourishment in proportion to their volume.

Plain ice creams, preferably flavored with vanilla, are allowable.

Beverages in Febrile Disease.—In all fevers the liberal use of water, either plain or flavored with lemon juice, is necessary. It not only mitigates the thirst but acts as a diuretic and aids in “flushing” the system through the kidneys. Patients in the later stages of fevers who are unable to ask for it should be regularly given water in sufficient quantities by the nurse. Lemonade, if preferable to water, should be not too sweet and if the patient desires may be made with any of the carbonated waters. The juice of squeezed fruit strained and either clear or diluted with water is often well-borne. It contains some nutriment and is slightly laxative. Barley or oatmeal water, plain or sweetened and flavored with fruit juices, is often palatable. In the milder fevers tea or coffee once a day will do no

harm, but when there is difficulty in sleeping, nervousness or indigestion these should be interdicted.

The nurse should remember that thirst is much more thoroughly assuaged by sipping than by taking considerable quantities at one time. The patient may be allowed to choose the temperature of his beverage, for he is much more likely to take the necessary quantity of fluid if this privilege be granted. Too much cold liquid in the stomach may cause indigestion or cramps, but these may be avoided by giving only small quantities at a time.

Diet in Convalescence.—Patients who have passed through a protracted and severe illness should exercise great care in coming back to ordinary diet, for any alimentary disturbance may cause a rise in temperature and other untoward symptoms; consequently a gradual return to solid diet is advisable.

Often the first solid food allowed is a sandwich of dry toast or zwieback and scraped beef or minced chicken; later the variety may be increased by the addition of soups thickened with rice, barley, plasmon, vermicelli or noodles. The various cereals, plain custards and stewed fruits may be added in quick succession.

Below is given a diet list for convalescents from ordinary febrile diseases. Such a list must be greatly modified for typhoid fever patients or those who have suffered from other fevers which especially affect the digestive system.

FIRST DAY.

Breakfast.—Soft-boiled egg, zwieback, cocoa.

Luncheon.—Egg-nog.

Dinner.—Bit of breast of chicken, slice of dry toast.

Luncheon.—Cup of hot bouillon.

Supper.—Scraped beef sandwich, lemon jelly, glass of milk.

SECOND DAY.

Breakfast.—Poached egg on toast, cocoa.

Luncheon.—Cup of junket.

Dinner.—Purée of potato soup, crackers or zwieback, rice pudding with cream.

Luncheon.—Milk punch.

Supper.—Milk toast, wine jelly, cup of tea.

THIRD DAY.

Breakfast.—Egg omelette, roll, coffee with cream and sugar.

Luncheon.—Hot beef broth.

Dinner.—Lamb broth with rice, bread and butter, a little vanilla ice cream.

Luncheon.—Cup custard.

Supper.—Half dozen raw oysters, crackers, junket, cup of tea.

FOURTH DAY.

Breakfast.—Baked apple with cream, oatmeal or other cereal with cream and sugar, soft egg, dry toast, coffee.

Luncheon.—Chicken broth.

Dinner.—Purée of celery soup, crackers, broiled lamb chop, mashed potato, wine jelly.

Luncheon.—Cup of junket.

Supper.—Scrambled eggs, dry toast.

FIFTH DAY.

Breakfast.—Orange, cereal with cream and sugar, coffee or cocoa, roll and butter, poached egg on toast.

Dinner.—Half dozen raw oysters, consommé with vermicelli, small piece of tenderloin steak, creamed potatoes, vanilla ice cream or lemon ice.

Supper.—Creamed toast, baked apple with cream, cup of tea.

CHAPTER IV.

FEVER (Continued).

The Nurse: The Sick-room and its Furniture: The Patient: Quarantine: Disinfection.

The Nurse should go to her patient provided with her usual outfit, a description of which is unnecessary; she should be cleanly in person and attire, observant and tactful. She should not, under any circumstances, converse, with either the patient or members of his family, upon other cases of like disease which she has cared for and, above all, she should not, no matter what she may think, criticize the attending physician's administration of the case.

The Sick-room.—The apartment used by a person ill with febrile disease should be, if possible, at the top of the house, for the air here is purer than that nearer the ground. Since it is to be occupied during the term of illness by at least two persons, the patient and the nurse or nurses, it should be large. Every adult requires at least three thousand cubic feet per hour of fresh air, and this will necessitate a room the capacity of which is about six thousand feet. Such an apartment is approximately fourteen feet square by eleven feet high, or of such proportions that its cubic content

is that of a room of these dimensions. A room of this size does not allow space for large pieces of furniture, and if it is to contain such its measurements must be correspondingly larger. Sufficient number of windows is necessary to insure plenty of light and proper ventilation, for while fever patients are more sensitive to sudden draughts than persons in health, fresh air is an all-important consideration. Too bright light in a sick-room is to be avoided, nevertheless the apartment should be kept cheery rather than gloomy. It will seldom be found necessary to darken the apartment except in cases involving brain or eye complications. Proper shades for the windows will, when carefully disposed, be found to admit a sufficient degree of light. Ventilation in a private dwelling is usually provided by doors, windows and fireplaces, mechanical ventilation being seldom found in any except public buildings. Having recourse to these three means of ventilating the sick-room, we must contrive to arrange for sufficient change of air to afford proper ventilation without allowing draughts. The fireplace offers a fair outlet to vitiated air but its chief fault is that its opening is near the floor while impure air seeks the upper levels of the room atmosphere. An occasional fire built upon the hearth will increase the usefulness of this means of ventilation. Various appliances may be used to render the windows better ways of egress for impure air and of ingress for pure. One of the best of these is a piece of

board four or five inches wide and as long as the width of the window-frame in which it is to be used. The window should be lowered from the top just far enough to admit the board which is placed in position, then between the upper and lower sashes there is a narrow space through which outside air may enter. Through the board may be bored holes of various number, depending upon the temperature outside, through which the air of the room may make its exit. In cold weather, or when the outside air is smoky or dusty, the opening between the two sashes may be packed with varying degrees of tightness with cotton. The temperature of the room should be from 65° to 70° F. (18.4° – 21.1° C.) in cold weather and in summer as near this temperature as is practicable. In hot weather the blinds and windows should be kept partly closed during the day and opened at night. An electric fan may add to the thoroughness of the ventilation and to the patient's comfort.

There should be no hangings, pictures or carpets, and as little furniture as possible in the ideal sick chamber; this must be insisted upon in cases of contagious disease. If there be a set wash bowl in the apartment it is well to keep its outlet plugged lest impure air enter through a possibly defective trap. The floors and walls should be bare and smooth so that they may be easily cleaned and washed with disinfectants if

necessary. Adjoining the sick-room there should be a bath-room, with tub, wash-bowl and water closet. All creaking doors and blinds should be oiled. The patient's apartment should be kept as fresh and cheery as possible, and cleanliness must be attained by daily mopping the floor with a mop dampened with a disinfecting solution (1 to 1,000 mercury bichlorid) and by wiping walls, wood work and furniture with cloths dampened in the same medium. If sweeping is absolutely necessary the floor should first be dampened. Dry sweeping and dusting are to be absolutely forbidden.

Unpleasant odors may be dispelled by sprays of Labarraque's solution or of cologne water unless disagreeable to the patient. Fresh flowers may be allowed in the room but upon leaving it should be burned.

A roomy closet is a convenient and almost necessary adjunct; in it may be kept various unsightly utensils, medicine bottles, disinfecting solutions and the like, and in non-contagious cases, bed-linen, towels, etc.

During the day the room may be kept as bright as the patient wishes. Should he prefer a dim light this may be provided for by shading the windows and screening the bed. At night the lamp should be low and so disposed that its rays do not fall directly upon the patient.

The Furniture.—The bedstead preferably should be of metal of plain design and furnished with a stiff wire

mattress. The single bed is better than the double since it permits the nurse to handle the patient with far greater ease. The iron hospital bedstead which stands about six or eight inches higher from the floor than the common article is much the most convenient. Four wooden blocks each with a depression in its top, into which the casters fit can be used to increase the height of an ordinary bedstead. The location of the bed should be such as to provide easy access to each side, out of the passage of draughts and not in too bright light.

The mattress should be thin and stuffed with hair. In some hospitals instead of a mattress a number of blankets folded to the proper shape and size and placed directly upon the springs are used. These make an excellent and comfortable bed, the great advantage of which is ease of disinfection.

The sheets should be of cotton rather than of linen and beneath the drawsheet a piece of rubber or oil-cloth, to protect the mattress from discharges, should be placed. Folded newspapers will answer this purpose in an emergency.

Woolen blankets afford the best bed covering, being warmer for their weight and more easily disinfected than any other.

The other pieces of furniture of the room should be of plainest design and as few in number as possible. Two chairs, one of them a steamer chair perhaps, but

neither of them rockers and both with as little upholstery as possible, and two or three small tables, one of them a bed table (a table with its point of support at one side so that its top can be placed over the bed) a commode, a screen and a back rest, should be sufficient.

The Patient should wear a night shirt open entirely down the front to facilitate changing and physical examinations by the physician. In the case of women the hair should be neatly braided, or if considered necessary, it may be cropped. Severe febrile disease may be followed by loss of the hair; fortunately such a loss is rarely permanent.

The nurse should assist the patient at his toilet morning and evening; his face and hands should be gently bathed with wash cloth or cotton, soap and warm water, the mouth should be rinsed and when desirable, the teeth may be brushed. The hair should be neatly and freshly arranged, and shaving, with the permission of the physician, may be permitted. The patient should be given a general cleansing bath with soap and warm water each day, and frequently his comfort may be greatly increased by an alcohol rub. If he is allowed to rise for urination and defecation he should be wrapped in a flannel dressing-gown and assisted to the commode which must be placed near the bed. In severe cases it is always desirable that the bed pan be used. Although some patients will insist upon their inability to use this vessel, a little tactful persuasion will

generally convince them of their error. Should any accident befall during its use or that of the urinal the soiled linen should be at once removed and the skin cleansed.

Visitors to patients ill with febrile diseases should be few and it is better to permit none at all until the period of convalescence has begun. The fewer the visitors allowed the less will the patient be distracted and excited, for even if visits please him their ultimate effect is untoward. If no visitors are allowed then there is no danger of their contracting or transmitting the disease if it prove contagious. In cases of recognized contagious disease visitors must be absolutely interdicted. If the physician, as is his right and oft-times his duty, forbid all visitors, even members of the family, entrance into the patient's presence, then the nurse can enforce the orders without causing hard-feeling toward herself.

The nurse should perform her various duties quietly and regularly, and in particular, all duties directly affecting the patient should be transacted, if possible, at the same time every day; making the bed and the patient's toilet, and especially administering his food, should be done according to schedule.

Usually the physician will call at about the same time each day and, when method is the watchword of the sick-room, the nurse will always be prepared for his entrance either at the regular hour or at any other.

Nothing is more disturbing to the entire scheme of sick-room administration than a visit from the medical attendant when the nurse is unprepared for the event. The nurse should rise at his entrance, if not already standing, and accompany him in his inspection of the apartment and patient. She should maintain a discreet silence, speaking only in response to questions. At the close of the visit, if there be anything not down upon the chart which she wishes to report or any point which she wishes elucidated she may make the report or the necessary inquiries. She must note the physician's orders upon a bit of paper; on no account may she trust to memory for them. After his departure these should be put among the charts and records of the case wherein are noted the patient's temperature, pulse and respiration; number and character of stools; quantity of urine; time, quantity and character of feeding; medication, etc.

No single nurse is able to care for a severe case, nor can she be expected to do night and day duty in a light case; in the former contingency a second nurse is necessary and in the latter, a member of the family or a servant must give assistance.

In all severe cases a night as well as a day nurse is required, each caring for the patient for twelve of the twenty-four hours. Seven o'clock in the morning and seven in the evening are convenient hours for changing.

The nurse's meals should not be served in the sick-room for obvious reasons.

Disinfection During and After Febrile Diseases.—Since it is of the most paramount importance in the prevention of the spread of infectious fevers that all contaminated material should be properly treated and proper disinfection carried out when the case is finished and since upon the nurse the duty of seeing that this is accomplished frequently devolves, it is necessary that she should be thoroughly conversant with the means and methods to these ends.

In considering this subject it is well that a clear knowledge of the term "disinfectant" be insisted upon; since so many substances are sold under this name that are far from being what they purport to be, it is necessary that the term should be strictly definite and that only such substances be used in this important connection as are of known composition and efficacy.

All authorities are agreed that a true disinfectant is a substance which *destroys* all infectious organisms with which it comes in direct contact, while an antiseptic is one which merely checks the growth and multiplication of such germs, not, of necessity, destroying them; and that a deodorant is a substance which merely neutralizes offensive odors, acting as a germicide or not, as the case may be.

Steam under pressure is the most certain disinfectant and the only one upon which we can safely rely in the

disinfection of clothing, bedding and the like. *Sulphur dioxid gas* is an effective germicide and it may be produced by burning the ordinary rolled sulphur, which is cheap and easily obtainable, or the sulphur candles specially prepared for disinfecting purposes. It must be remembered that sulphur dioxid gas bleaches and is otherwise injurious to delicate fabrics, and gilded articles, such as picture frames.

Formaldehyde gas is an efficient disinfectant and is free from certain disadvantages which sulphur dioxid possesses, in that it does not affect fabrics and decorations to any appreciable extent. Tablets may be purchased of the apothecary, which, when burned in a specially constructed lamp, generate this gas. They are inexpensive and easily manipulated but give off the gas so slowly that an apparatus which produces the gas rapidly and forces it into the apartment is far preferable. Such an apparatus is, unfortunately, complicated and expensive, but if available provides, perhaps, the best method of securing disinfection by formaldehyde.

It is absolutely necessary that disinfection of apartments be carried out in the absence of human beings, for it is quite impossible for respiration to be sustained in such an atmosphere as is requisite for the destruction of germ life. All attempts at disinfection during the patient's illness by means of placing vessels containing carbolic acid about the room, by burning bits of sulphur or by spraying disinfectants into the air are worse than

futile since they make the patient uncomfortable. Good ventilation will accomplish far more as regards disinfection than all these means combined.

Before leaving the sick-room, a patient who has had an infectious fever should be given a thorough bath and shampoo with soap and hot water and then be sponged off with a 1 to 3,000 solution of mercury bichlorid or immersed in a 1 to 5,000 solution of bichlorid bath. He then should be dressed in a clean night dress and removed to another apartment where he may put on other clothing.

The disinfection of the sick-room and its contents depends largely upon the means at the disposal of the physician and nurse. If a steam disinfecting plant is at hand the bedding, draperies and other fabrics should be made into bundles, wrapped in clean sheets and removed for steam disinfection. By carefully carrying such bundles, they may be transferred to the disinfecting station with little danger. The bedstead, furniture and woodwork must be carefully washed with a soft cloth wet with 1 to 1,000 bichlorid solution or 3% carbolic acid. All cracks and crevices must receive studious attention. The removal of all unnecessary articles at the beginning of the disease greatly simplifies the disinfecting process. The walls, if painted, should be treated in the same manner as the wood work; if they are papered they should be thoroughly rubbed with

pieces of bread, then, if practicable, the old paper should be removed and the walls repapered.

After these details have been attended to all the windows and the doors, with one exception, should be closed and sealed by pasting strips of paper with common flour paste over all the cracks. The sealing process is important, for upon the tightness of the room depends, in great measure, the efficacy of the disinfection. If the cracks allow the escape of the disinfecting gas, the process is of little value. Before sealing the last door all draperies which have not been removed must be spread out and all drawers, closet doors, etc., widely opened.

Sulphur dioxid or formaldehyde gas may be used to disinfect the room. If the apartment is bare and contains little decoration the former may be employed; if the reverse is the case the latter is to be preferred. If sulphur disinfection is chosen, four pounds must be used for each 1,000 cubic feet of room space. A simple method of generating the gas may be arranged as follows: Two or three bricks are laid upon the bottom of an ordinary wash tub and upon these is placed a dish-pan or other metal receptacle which is to hold the sulphur. The tub should contain enough water to cover the bricks and the bottom of the pan, so that there shall be no danger of fire. For this reason the vessel which holds the sulphur must never be placed upon the floor. The sulphur is to be broken in small

pieces, over which alcohol is poured and set on fire by touching a match to the mixture. The operator should stand at as great a distance as possible while applying the match. If enough alcohol is used the sulphur will be almost entirely consumed, and it is important that the pan should not contain too much sulphur, as in this case the combustion will not be complete. On this account it is better to use two or more pans for the sulphur if the room is large. To produce proper disinfection it is necessary that moisture be present, and to provide for this, unless the weather is damp, we must supply this lack. This may be done by boiling water over a gas stove or by pouring boiling water from one vessel into another in the room just before the disinfection is begun. Another method is to place a vessel of water a few inches above the burning sulphur. The sulphur should always be prepared so that it may be at once set on fire after the moisture has been supplied. After lighting the sulphur the room should be immediately closed and the door of exit sealed as described above.

If formaldehyde gas is employed it may be generated from the tablets mentioned in a preceding paragraph or generated from formalin in an apparatus which sends the gas rapidly through a tube passed into the keyhole of a door. The latter method is preferable but less practicable than the former.

Whichever method is chosen the room should remain sealed for at least eight hours. Even at the end of this time great care must be exercised in entering the apartment, and in so doing it is wise to wrap the face in a wet towel, pass quickly to a window and open it to allow the gas to escape and the fresh air to enter.

Disinfection of Excreta, etc.—During the illness all feces, urine, pus from abscesses and all other discharges should be so disposed of that any infective material that they may contain shall be rendered harmless. All substances cast off from the body should be received into glass or porcelain vessels containing a considerable quantity of disinfectant. The following are solutions adapted to this purpose:

1. 1 to 1,000 mercury bichlorid solution.
2. 5% carbolic acid solution.
3. Calcium chlorid four ounces to one gallon of water. This last must be prepared freshly every day.

The ordinary disinfection of feces in the sick-room by nurse or attendant is of little value. This is due to the facts that the solution is seldom of sufficient strength and that the fecal matter is not thoroughly mixed with the disinfectant. The feces must be carefully macerated so that the disinfectant shall come in contact with every atom and the mixture must be allowed to stand for several hours. It may then be disposed of through the water closet or buried. Burying undisinfected stools cannot be too strongly con-

demned and is a serious menace to the public health.

The urine should be mixed with at least one tenth of its volume of 1 to 1,000 bichlorid solution and allowed to stand for ten minutes before being thrown out.

Sputum should be expectorated into vessels containing 1 to 10 carbolic acid solution or the lime solution given above. Remnants of food should be disinfected in like manner. Pus dressings, etc., should be burned.

All bed-linen and clothing should be immersed in 1 to 1,000 bichlorid solution or three per cent. carbolic acid immediately upon removal and allowed to stand for at least two hours before being sent to the laundry.

It is advisable for the nurse to make a stock solution of twenty-five per cent. bichlorid, bottle and label it with a table giving the proportion to be added to water to make solutions of various strengths. From this stock bottle solutions may be prepared as needed. This obviates waste of time in dissolving tablets and is very economical.

The surface of the patient's body and that of the attendant when soiled with discharges should at once be washed with a suitable disinfecting agent (1 to 5,000 bichlorid). In diseases like small-pox and scarlet fever sponging the patient's body once a day with this solution is to be advised.

The nurse should always change her clothing and sterilize her hands before eating. The latter may be

done by thorough washing with soap, hot water, brush and 1 to 5,000 bichlorid.

After death from an infectious disease the body should be sponged with bichlorid or carbolic solution, the mouth, nostrils and anus plugged with pledgets of cotton moistened with either of these, wrapped in a sheet saturated with a disinfectant, placed in a metallic or air-tight coffin and buried as soon as possible. The disposal of such bodies by cremation is always to be preferred when practicable.

The Disinfection of Water-closets, Drains, Sinks and Privies.—In the disinfection of these nothing is more convenient and effective than lime chlorid, which is a mixture of various chlorin compounds, or milk of lime freely used; the latter is made by adding one pound of freshly slaked lime to two or three quarts of water. Lime chlorid should be purchased in sealed packages only, otherwise its efficacy as a disinfectant is slight. Air-slaked lime is of no use as a disinfecting agent.

The fecal discharges from patients suffering from dysentery, cholera or typhoid fever should never be finally disposed of without previous disinfection as described above. All sinks, drains, water-closets, etc., should be thoroughly flushed several times daily and in the intervals of flushing chlorid or milk of lime should be allowed to remain in them. The seats of commodes and water-closets must be immediately cleaned, with a disinfectant, of any discharges which may soil them.

CHAPTER V.

INFECTIONS OF CONTINUED TYPE.

Enteric Fever: Paratyphoid Fever: Weil's Disease: Typhus Fever: Yellow Fever: Influenza: Malta Fever: Mountain Fever: Acute Miliary Tuberculosis: Chronic Pulmonary Tuberculosis.

ENTERIC FEVER.

Synonyms.—Typhoid fever; nervous fever; abdominal typhus.

Definition.—A communicable fever lasting three to four weeks, marked by inflammation and ulceration of certain glands in the intestine, catarrhal inflammation of the mucous membrane lining the intestine, enlargement of the mesenteric lymph glands and the spleen and an eruption of small rose-colored spots appearing in crops upon the chest, abdomen and flanks.

Causation.—The disease is both endemic and epidemic and is found in all climates, although its severity may vary greatly in different places. It is more common in the Eastern and Middle States than farther west and is continuously found in the larger cities, in which there are a certain number of cases to be found at all times. The most favorable time for the disease is the late summer and early autumn, and it is more

prevalent and severe in dry than in wet seasons. Young adults (15 to 35 years) are more susceptible than are children and old persons. When there is no difference in the exposure the infection is equally frequent in males and in females. As is the case with all infectious fevers not all exposed persons acquire the disease. Those whose condition is below par are more likely to suffer from it than those in robust health, and some individuals seem to be more susceptible to the infection than others. One who has once had the disease seldom suffers from a second attack.

The actual cause of the disease is the *bacillus typhosus* which was first described by Eberth in 1880. The bacillus gains entrance to the body usually through the alimentary tract, but may be breathed in with air contaminated by the dust of dried undisinfected stools. The germ is not destroyed by drying and may live for months in the soil and upon clothing. It is not rendered harmless by freezing and therefore the disease may be conveyed by ice. It may be taken into the body with water contaminated by sewage, milk from vessels washed with infected water, upon vegetables which have been fertilized with sewage, oysters from beds near sewer exits and flies may transmit the contagion by alighting upon food after having been infected from privies.

Nurses may infect their hands from stools, bath water, thermometers, etc., and laundresses who wash

undisinfected clothing also may convey the bacilli to their mouths while eating with infected hands. Bath water splashed into the mouths of attendants may also transmit the disease. Many persons who drink the various bottled spring waters hoping to avoid the disease forget that the ice used may be contaminated and that infected water used in brushing the teeth is as dangerous as when drunk; consequently the nurse should cool all mineral waters, etc., by placing the bottles upon ice rather than by mixing cracked ice with them.

The bacillus may be found in the feces within five to ten days after the disease has begun and it may remain in them through the convalescence, but usually it disappears within about ten days after the fall of the temperature to normal.

The urine contains the typhoid germ in a considerable number of cases, but as a rule not until late in the disease. The organism often persists in the urine for some weeks after the patient has apparently recovered. It may also be found in the blood, the perspiration, the rose spots, the intestinal ulcers, and in the pus from abscesses which often complicate the disease, and it is probable that it exists in the expired air and in the sputum of cases complicated by bronchitis or pneumonia.

The Onset of the Disease.—Usually typhoid fever develops gradually and the patient may be quite unable

to fix definitely the first day of his disease. In ordinary cases the day upon which he went to bed is considered as the first day, but in hospital cases and many others the use of such a rule as a routine will give rise to many errors.

The usual mode of onset is as follows: The patient notices slight chilly feelings, followed by feverish sensations, severe headache, nausea, vomiting and considerable prostration. Nose-bleed and cough are frequent early symptoms. Various unusual modes of onset may occur:

(a) *Ambulatory or Walking Typhoid.*—In this variety the patient keeps up and about and attempts to work. He realizes that he is not perfectly well but feels hardly ill enough to go to bed. When he is first seen by the physician he may have a high fever and a well-developed rash. Such cases are likely to prove severe because of the lack of proper care in the early stages.

(b) *With Marked Gastro-intestinal Symptoms.*—The nausea may be severe and the vomiting almost continuous and very difficult of control. There may be profuse diarrhea.

(c) *With Intense Pulmonary Symptoms.*—The usual cough accompanying the onset may be much accentuated and the chill and pain in the side be of such character as to strongly suggest pneumonia.

(d) *With Symptoms Referable to the Kidneys.*—Dark or bloody urine containing albumin and casts may exceptionally be a feature of the onset.

(e) *With Pronounced Nervous Symptoms.*—Agonizing and obstinate headache or facial neuralgia may be initial symptoms. In some cases when the patient has kept about during the early weeks delirium may be the first symptom to appear. Rarely the disease may begin with twitchings of the muscles or convulsions, stiffness of the neck and dread of bright light. Drowsiness, apathy and stupor may exist for some days before other and more typical symptoms develop. Infrequently mania may be the first symptom. In alcoholic patients the various nervous manifestations are especially marked.

(f) *Hemorrhage from the Intestine or Perforation of the Bowel* are very rare symptoms of onset.

The Course of the Disease.—The incubation period is from ten to twenty days, usually about two weeks, and the ordinary duration of the disease is four weeks; to each week belong certain symptoms.

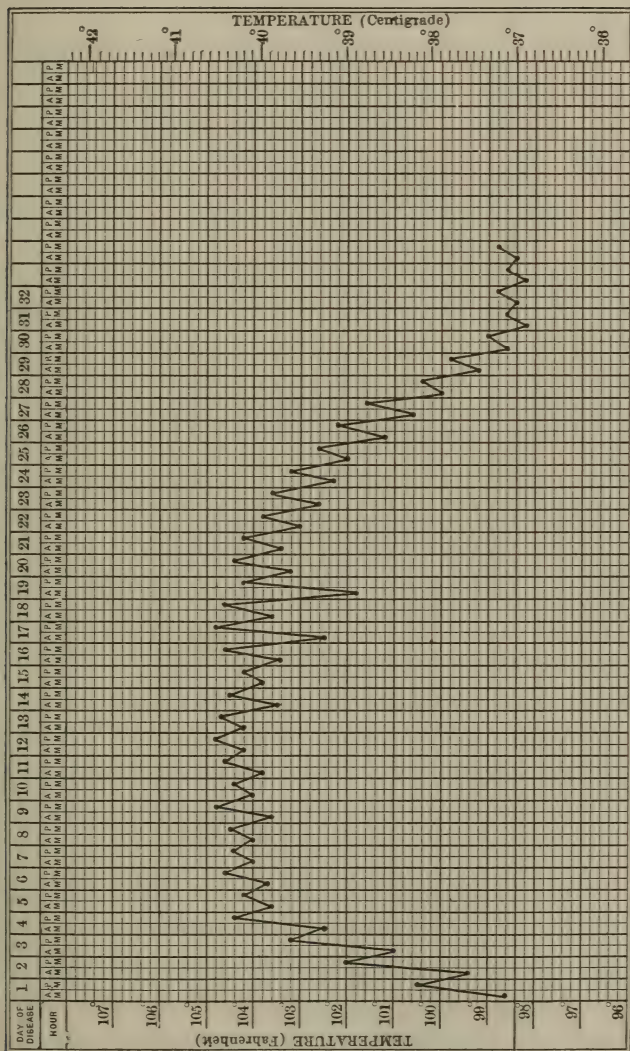
The typical temperature of typhoid fever is as follows: During the first week the temperature rises regularly each day, being lower in the morning than in the evening, but day by day the difference between these temperatures becomes less. The temperature the second week is continuously high and there is little difference between that of the morning and that of the

evening. In the third week the morning temperature becomes lower while that of the evening remains as high as during the second week. The typical fourth-week temperature is one in which the morning temperature falls gradually lower and that of the evening does likewise, dropping a little lower each day, until both it and the morning temperature reach normal. On the opposite page is depicted the chart of a typical case of typhoid fever in which the temperature has been uninfluenced by antipyretic drugs or baths.

Complications may alter the course of the temperature. Intestinal hemorrhage and perforation are usually followed by a rapid and considerable fall. In fatal cases the temperature is likely to continue high until death. The height of the fever is, as a rule, in direct proportion to the severity of the disease but in some fatal cases the temperature may never reach a very high level.

The pulse usually bears a direct relation to the temperature curve. In the first week it is full, strong and of 90 to 100 beats to the minute, during the second and third weeks it is likely to become more rapid, feeble and perhaps dicrotic.

Various deviations from the typical temperature curve are frequent. When the disease begins with a chill the fever may rise at once to 103° F. (39.5° C.) or 104° F. (40° C.). Often defervescence takes place at the end of the second week and the temperature may



CLINICAL CHART OF ENTERIC FEVER OF FOUR WEEKS' DURATION, without complications, which shows the temperature curve as uninfluenced by treatment.

fall to normal within twenty-four hours. A temperature higher in the morning and lower in the evening may occur but has no particular significance. Sudden falls of temperature may take place and usually indicate intestinal hemorrhage or perforation. Hyperpyrexia (temperature above 106° F.— 41.1° C.) is rare but may occur just before death.

There may be chills at the beginning of the disease; at intervals during its course; with the onset of complications; after the use of antipyretic drugs; and during convalescence without assignable cause.

Sweats may accompany the chills but profuse perspiration is rare though the abdomen and chest may at times be moist, especially during the reaction from a bath.

Rises of Temperature After Defervescence (Recrudescences) may take place even after there has been no fever for several days. Such rises may last for a number of days and then disappear. With these there is no constitutional disturbance but they are, nevertheless, causes of anxiety. These are usually due to improper feeding, constipation or unwonted mental exertion.

There are cases in which convalescence has apparently become established but which continue to have an evening rise of temperature of one or two degrees (F.). This may be due to starvation but cause one to search for complications. In excessively nervous

patients such an evening rise is a frequent occurrence, but if the patient show no other symptoms, it may be disregarded. It often disappears if the patient be allowed to sit up and be given solid food in small quantity and the use of the thermometer be discontinued.

Relapses are due to a fresh infection and may last varying lengths of time, but as a rule they are shorter than the original fever. The temperature rises and declines gradually and is accompanied by a return of the symptoms.

Afebrile Typhoid (typhoid fever without rise of temperature) has been observed, but is of very rare occurrence.

Symptoms—*The Facial Appearance*.—Early in the disease the face is flushed and the eyes are bright; by the beginning of the second week the expression becomes apathetic and at the height of the infection it is dull and listless. The lips and cheeks may retain a good color throughout the disease.

The Skin is usually dry. The typical eruption of typhoid fever appears in crops from the fifth to the twelfth day of the disease and consists of small, isolated, rose-colored, slightly elevated round or oval spots of about the diameter of a pinhead (2 to 4 millimeters). They disappear on pressure but immediately reappear when pressure is removed. They are seen earliest upon the back, and slightly later upon the front of the chest and abdomen. They may be found upon

the arms and thighs but very rarely upon the forearms and lower legs. They appear in successive crops, each crop lasting two to four days, while the eruptive period lasts from two to twenty-one days. Relapses show a fresh eruption and the spots may appear after the establishment of convalescence. Some cases show no eruption whatever.

The Typhoid Tongue is at first moist and down its center is a strip of whitish fur; its edges and tip are red. In mild cases the tongue continues moist throughout the disease, but in severe cases it becomes dry, brown and cracked. Rarely it may remain clean but become dry, glazed and fissured in the later weeks. As convalescence progresses the tongue gradually re-assumes its normal appearance.

A Typical Case of Enteric Fever.—During the period of incubation of from ten to twenty-one days the patient suffers from indefinite feelings of languor and is disinclined toward exertion of any sort. He lacks energy and may complain of general muscular soreness.

First Week.—At the invasion of the disease there are indistinct chilly feelings (rarely a distinct chill), severe frontal headache and pains in the back and limbs; the tongue is coated down its center, its edges and tip are redder and the papillæ more prominent than usual. There may be spontaneous nose-bleed and there is often cough due to slight laryngitis or bronchitis.

The eyes are suffused. The patient feels feverish, is thirsty and complains of weariness, sleeplessness and nausea which is often accompanied by vomiting. Constipation is the rule, but there may be diarrhea. There may be sore-throat with pain on swallowing.

Patients during this stage of the disease may continue up and about (walking typhoid), but usually they find that they are more comfortable in bed. The temperature of the first week has been described. By the fifth or sixth day it reaches an evening height of 103° to 103.5° F. (39.5° to 39.8° C.). The pulse is rapid, strong and bounding, 90 to 100 per minute and very rarely may be dicrotic. By the end of the week the typical facies of the disease appears and the expression is dull and lethargic. A few spots may have shown themselves and the spleen may be palpable.

Second Week.—As the second week progresses all the symptoms become accentuated with the exception of the headache, nausea and vomiting. These usually cease. The temperature continues high (103.5° to 104° F.— 39.8° to 40° C.) with slight morning remissions. The pulse becomes softer, feebler and more rapid (100 to 120). Bodily weakness is pronounced and the patient has no desire to move. Early in the week the rash becomes evident. The tongue is dry, brown and tremulous; there is likely to be diarrhea, three to five thin pale yellowish-brown stools a day (pea-soup stools). Mild delirium may appear late in

this week; at first it may be present only at night, later it lasts through the day as well and the patient shows other signs of great nervous weakness, such as avoidance of light, slight deafness and twitching of the muscles. If there is no delirium the patient is very stupid, takes no interest in his surroundings and makes no requests.

Third Week.—The symptoms of the second week continue and become more pronounced. The temperature continues high, but as the week nears its close the morning temperature is likely to fall to a lower level (101° to 102° F.— 38.3° to 38.9° C.). The pulse may become very rapid and weak and perhaps dicrotic. The tongue becomes more dry and cracked, and the patient may be unable to protrude it. Bed-sores may appear and retention of urine and incontinence of feces may occur. The nervous symptoms become more marked, the twitchings are more noticeable and the patient may pick at the bed-clothes and grasp at imaginary objects. Intestinal hemorrhage may be evidenced by blood-tinged stools or blood in considerable quantity may flow from the rectum, leaving the patient in collapse with a sudden fall in temperature, imperceptible pulse and other evidences of extreme prostration. Congestion of the lungs or pneumonia is likely to complicate the disease in this week. Distention of the abdomen by gas is not infrequent. The patient may die or go on to

The Fourth Week.—Now the morning temperature falls still lower and the evening rise gradually becomes less until the former reaches normal and the evening 101° to 102° F. (38.3° to 38.9° C.). As the fever diminishes the other symptoms gradually ameliorate, the tongue becomes moist, the pulse stronger and the nervous manifestations disappear. A returning appetite may evidence the patient's improvement.

The Fifth Week.—The patient may go on to complete recovery, the fever may last two or three weeks longer in severe cases, or after a normal temperature lasting several days a relapse may take place.

Convalescence is slow. The patient is extremely weak, although he feels well and is extremely hungry. He is able to sit up only a few minutes at a time and walking is well-nigh impossible. Relapses may be brought on by slight errors in diet or by over-exertion. The patient should not be allowed up for at least a week and he should not be permitted to walk before the tenth day. There may be dysmenorrhea and there usually is some loss of hair. Full strength may not be recovered for a number of months.

Menstruation usually take place early in the disease as in health, but in the later weeks and in convalescence may be absent. Pregnant women, though they rarely contract typhoid fever, frequently abort during its course. L. of C.

Complications.—*Thrombosis* of the veins is a fairly frequent complication, and is caused by the stoppage of the flow of blood through a vessel by a clot. It occurs most often in the veins of the thigh and is indicated by swelling, edema and tenderness of the affected part.

Hemorrhage from the Intestine occurs in about four per cent. of all cases; there may be only slight streaks of blood in the stools or a free hemorrhage which may or may not result in death. It is usually caused by the ulcers in the intestine eating through the coats of the blood-vessels and is most frequent in the third week. It may appear without warning and if large, results in immediate collapse with its attendant symptoms.

Perforation of the Bowel is less frequent and is the most serious complication of the disease. It occurs usually in the third week and is the result of the ulcers eating their way entirely through the wall of the intestine. It is usually evidenced by sudden acute pain in the abdomen, rapid fall of temperature and marked collapse. Peritonitis results and is indicated by vomiting, abdominal distention, tenderness and rigidity.

Peritonitis without perforation may occur by extension of the inflammation within the intestine to the peritoneum surrounding it.

Abscesses in various parts of the body may appear. These give the usual symptoms of abscesses from ordinary causes.

Typhoid Spine is a rare complication and is the result of inflammation of and around the bodies of the vertebræ.

Bronchitis of mild or severe type occurs frequently at the onset and is evidenced by cough and more or less muco-purulent expectoration.

Pneumonia may complicate the disease early or in the later stages. In the latter case it may be overlooked, for frequently the symptoms are not well marked.

Neuritis (inflammation of the nerves) is fairly common and may occur during the course of the disease or in convalescence. Its onset is marked by great pain and tenderness along the course of the affected nerves. There may be a slight degree of paralysis, usually involving the extensor muscles of the limbs and evidenced by wrist- and foot-drops.

Bed-sores may develop in severe cases and in those not well cared for. They are an unnecessary and dangerous complication.

Albuminuria is common and when merely due to the infection is of little significance. It may, however, go on to a true nephritis.

Various other complications are described but are of more or less rarity.

Typhoid Fever in Children.—The disease is fairly common in children but is rare in infants. Its course

is mild and the symptoms, except the mental dulness and apathy, are usually not well marked.

Typhoid Fever in Old Persons.—After the age of forty the disease is rare but of severe course, and although the temperature may not reach a high level, complications, especially pneumonia and heart weakness, are frequent.

The Widal Reaction is an aid in the diagnosis of the disease and is based upon the fact that the blood of a typhoid patient when added to a culture of the bacillus causes the organisms to aggregate into “clumps” and to lose their motility. In the city of New York the health department employs bacteriologists who make this test upon specimens of blood sent in by physicians. A specimen is prepared by drawing from the patient’s ear and collecting upon either end of a glass slide two good-sized drops of blood. These are allowed to dry and the specimen is then ready for examination.

Prevention.—Since the disease is caused only by the entrance into the system of bacilli from other patients the greatest attention on the part of the nurse should be given to the proper disinfection and disposal of *all* excreta. It is entirely insufficient to empty these into the various receptacles provided for their disposal, but it is absolutely necessary that they should be properly disinfected according to methods such as those described in the section upon disinfectants. Likewise the bed-clothing, bath water, the patient’s garments

and all objects and utensils with which he or the nurse, after handling him, comes into contact, must be subjected to thorough disinfection before being used again. After his recovery the sick-room with all its furniture should be treated in accordance with the directions laid down in the section upon room disinfection.

The typhoid fever patient is unlikely to be a source of danger to those about him, provided these precautions are taken and the nurse is scrupulously clean in dress and person, always changing the former, sterilizing her hands and washing her face before going to meals and upon leaving the sick-room for exercise, etc. She should also be very careful never to use her mouth as a receptacle for pins, pencils and the like, since carelessness in this regard may cost her her life.

Anti-typhoid Inoculation.—Recently attempts have been made with some success to prepare a serum which, when injected into healthy persons, may render them immune to typhoid fever, and experiments upon the English soldiers during the Anglo-Boer war in South Africa lead us to believe that individuals so inoculated are much less prone to contract the disease, and when they do suffer from it are much more likely to recover than those uninoculated. Unfortunately immunity so conferred lasts only for a period of weeks. It may be safely affirmed that the measure is one which, in properly selected cases, is not dangerous, and should not be

neglected when there is probability of exposure to the disease.

Treatment.—The specific treatment of typhoid fever by means of an antitoxin has as yet given no very favorable results.

The value of the antiseptic treatment of typhoid fever has never been questioned. The only difficulty is how best to secure its efficiency. This may be done most efficaciously by the administration early in the disease of certain intestinal antiseptics such as beta-naphthol bismuth or eudoxin, and after the first week of chlorin water in drachm doses every three or four hours. In such doses chlorin water can be safely administered until complete disinfection of the alimentary tract is obtained. Under its use the tongue becomes cleaner, the appetite and digestion better, the fever lower, and the stools devoid of odor save that due to chlorin. The general strength, intellectual processes and the nervous conditions improve, the disease is shortened and the patient usually proceeds to a rapid and complete recovery.

During the course of the disease a daily movement of the bowels should be secured by means of rectal enemata.

At the present time the treatment of typhoid fever by the Brand, or more properly the Currie-Jürgensen bath, is enjoying considerable vogue. Brand's original method has been modified so that the consensus of

opinion is now in favor of tub bathing at a temperature of from 80° to 90° F. (26.7° to 32.2° C.), although certain authorities believe that tubbing at 98° F. (36.7° C.) produces quite as good results and is much less disturbing to the patient. The duration of the baths is usually ten minutes. The patient should be lifted both into and out of the bath; he should be immersed to the neck and the head should be covered with an ice cap or cold cloth. Throughout the procedure the subject should be gently but thoroughly rubbed by the hands of at least two attendants. Stimulants should follow the bath and in weak patients should precede it. At the conclusion of the measure the patient should be dried in the recumbent posture, and if chilly, warmly covered. Fresh water should be used for each bath.

Sponges, sprinkle baths, cold wet packs, evaporation baths and bags of cold water may be used when tubbing is contraindicated, but are much less efficacious. Perhaps the best substitute for the tub bath is the bed bath. This is given upon a bed around the edges of which have been placed rolled blankets. Over these is placed a rubber sheet into which two or three pailsful of water are poured. The patient is placed in the trough thus made and is treated in the same manner as when the tub is used.

The frequency of the baths is governed by the height

of temperature, the severity of the nervous symptoms, the strength of the pulse and the general condition. The slightest indication of hemorrhage or peritonitis; extreme heart weakness; arterio-sclerosis; pneumonia; pleuritic effusion; phlebitis and old age are contraindications to tub bathing. The menstrual period and pregnancy do not absolutely contraindicate. Obese persons should be bathed with care. There are patients who, for no apparent reason, do not bear tubbing well, and in these cases it is wise to omit the process.

When heart weakness occurs in the course of the disease it may be controlled by alcohol and other stimulants. The headache, restlessness, sleeplessness and delirium may be controlled by hot or cold applications and sedative drugs. Bismuth and opium may be given if the stools become too frequent. The genito-urinary tract may be rendered less septic and the urine less infectious by the administration of urotropin in doses of five grains three times a day. The drug should be well diluted and thoroughly dissolved, and must be given with care. It is well to use it in the later weeks of the disease and during convalescence if not throughout the whole course of the infection.

This and all the drugs mentioned above must never be given by the nurse save when directed by the attending physician.

The disease in children may be managed in practically the same manner as in adults. Tub baths are

however less well borne and fortunately the disease runs a milder course in the younger patients.

The Treatment of Complications.—At the least sign of *intestinal hemorrhage* the strictest quiet must be enjoined; the patient must not be moved even to have his soiled linen changed, and food must be temporarily stopped. When feeding is begun again only such foods as are digested in the stomach and upper part of the intestine, such as beef-juice or peptonized milk, should be given and these in very small quantities at a time. If the patient is being bathed the baths must be omitted. Applications of cold in the form of compresses or the ice-coil should be made to the abdomen. If there are signs of collapse the foot of the bed must be raised and upon the physician's order hypodermatic stimulation administered (whiskey) and either hot normal saline injected directly into a vein or under the skin of the thighs or buttocks may be necessary. Drugs calculated to stop the bleeding may be ordered by the medical attendant.

Perforation of the Bowel.—When this takes place quiet is absolutely necessary until a surgical operation can be performed which should be done as soon as possible after the diagnosis has been made.

Peritonitis calls for the enforcement of complete quiet, the application of cold to the abdomen and great care in the administration of food.

Tympanites (abdominal distention by gas) may be diminished by the insertion of a rectal tube, by the application of hot-water bags or turpentine stupes to the abdomen, by the administration of a few drops of turpentine internally or by high rectal injections of hot saline solution upon the physician's order. Often by stopping the milk for from 24 to 48 hours we may prevent the formation of gas. In the interval broths and albumen water may be given.

Thrombosis is treated by the elevation of the affected part and by cold applications. The patient must remain quiet lest bits of the clot become dislodged into the circulating blood and cause thrombosis elsewhere.

Bed-sores should be guarded against by the strictest attention to cleanliness (see p. 54).

Constipation may be overcome by mild laxatives or by enemata of soapsuds. The latter should not be large and must always be given from a fountain syringe, with great care and only upon the physician's order.

Recrudescences and Relapses.—The management of the latter is identical with that of the disease itself, but the former are a more serious matter; in them only the mildest hydrotherapeutic measures should be used and heavy stimulation may be necessary.

The Diet.—While the febrile movement is present only fluid diet is allowable. Most patients do well upon a diet of milk alone, the quantity necessary for an

adult being about two quarts per day, six ounces being given every two hours. The milk may be cold, warm or boiled, as the patient prefers. It may be more acceptable if a little Vichy or other carbonated water be added or if flavored with a few teaspoonfuls of French coffee. When milk cannot be tolerated matzoon, kumyss or buttermilk may be substituted. If milk disagrees the tongue becomes heavily coated and tympanites, constipation or diarrhea with undigested curds in the stools may ensue. Such symptoms may be relieved by diluting the milk with equal parts of lime water or Vichy, by peptonizing the milk or by replacing it with a diet of beef, lamb or chicken broths and albumin water. The broths may prove more palatable when flavored with various vegetable extracts (onion, celery, etc.). The different prepared foods (malted milk, plasmon, etc.) and gruels may be tried; an occasional cup of cocoa will do no harm.

If the patient goes to sleep quickly after being wakened, feeding should be continued at proper intervals during the night; otherwise one or two feedings must be omitted.

The nurse must always record the total quantity of food taken each day.

Fluid diet as a rule should be continued for one week after the temperature has fallen to normal, but some patients, after all the symptoms have disappeared, continue to have an evening rise of temperature of two

or three degrees (F.); to such, if the nutrition is impaired and the need of food is manifest a gradual return to solid diet may be allowed. Usually the temperature promptly subsides and no harm is done.

The articles of solid food which are allowed first are purée soups, broths with rice, milk toast, soft-boiled eggs, junket and the like (see section on the diet of fevers in general, p. 64 and ff.).

Relapses and recrudescences necessitate an immediate return to fluid diet.

Nursing.—In a private house the bed should, when possible, be in a large, light, well-ventilated room from which all hangings and superfluous furniture have been removed. The temperature should not be above 70° F. and it is better to have it as low as 60° F. In favorable weather the windows should be open. Too bright light and too much darkness are to be avoided. The bed should not be too heavily covered, the bed linen must be frequently changed and kept perfectly smooth. In severe cases the air or water bed may be necessary. Early in the disease the patient should lie on his back, but later the nurse should encourage him to change his attitude so as to guard against pulmonary congestion and bed-sores. The mouth, teeth and tongue should be frequently cleansed. Studious attention should be given to the proper cleanliness of the body and all points at which bed-sores are likely to develop should receive special care. The bowels and bladder should be evacu-

ated only when the patient is lying on his back; the stools must be carefully watched for blood and milk-curds and if these occur they must be at once reported to the physician. The quantity, color and sediment of the urine must be noted.

When involuntary movements and urination are unavoidable, the soiled bed-clothing must be immediately replaced by clean linen, and disinfected. In such cases the change is greatly facilitated by having two beds and moving the patient when necessary from one to the other; at least two attendants are necessary for this process since the patient must remain absolutely passive.

The apartment should be kept quiet and free from disturbance of any kind for complete mental inactivity on the part of the patient is necessary. On this account visitors and all distractions should be forbidden.

It is best to have two nurses, and a member of the family may be allowed in the room when additional aid is needed. The bed should be of single size and high, with a firm, comfortable mattress protected by a rubber sheet. The clothing under the patient must be kept smooth to prevent bed-sores and in warm weather if he wears no night-shirt and is covered only by a sheet he will be more comfortable and will be spared the inconvenience of being undressed for each bath if these are given. Under these circumstances, wrinkling of the

clothing under him will be less likely to occur. The possibility of taking cold is very slight.

The patient's head should be kept low and nourishment should be administered through a tube or from a spouted cup. Temperature, pulse and respiration should be taken every three hours, but at night, unless the fever is above 103° F. (38.5° C.), it is wise to allow the patient to sleep without interference. He should not be allowed to see the temperature chart lest he be subjected to undue worry about his condition.

If the mind is clear it is well to explain the danger of attempting to sit up and of sudden movement, and if there is the least sign of mental aberration or delirium the patient must not be left alone for an instant.

The nurse should assist the patient to change his position at intervals during the later weeks of the disease even if he does not complain of discomfort.

On points other than those mentioned above the nursing of enteric fever should be carried on in accordance with the principles laid down in the sections on fever nursing in general.

PARATYPHOID FEVER.

This disease differs in no essential from true typhoid fever except in its causation. This is a bacillus intermediate in form between the true typhoid bacillus and the common colon bacillus. The symptoms, course, treatment and nursing of the two diseases are practi-

cally identical, in fact their differential diagnosis is impossible except by demonstrating the organism in the patient's blood or excreta. All that has been said in the previous section with regard to typhoid fever, except the paragraphs upon preventive inoculation and serum treatment, applies also to the paratyphoid infection. In the latter disease the sera for preventive inoculation and treatment must of necessity be products of the growth of the paratyphoid bacillus.

WEIL'S DISEASE.

Synonym.—Acute febrile jaundice.

Definition.—Weil's disease is an acute infectious fever, characterized by severe pains in the muscles, jaundice and a remittent temperature, which falls by crisis or rapid lysis.

Causation.—It usually occurs in the summer months and is most commonly seen in young adult males. Its specific cause is probably a microörganism which has not yet been identified.

Course and Symptoms.—The incubation period is usually about one week. The onset is sudden with a chill followed by fever, headache and severe pains in the muscles. About the second day jaundice appears, which may later become more pronounced, and is accompanied by itching. The temperature ranges from about 103° to 104° F. (39.5° to 40° C.), but may reach 107° F. (41.6° C.). There may be vomiting

and diarrhea; rarely there is delirium or coma. The liver and spleen are enlarged and tender; the urine contains bile pigment, albumin, casts and perhaps blood. The stools may be clay-colored. The disease usually continues from five to eight days, when the fever falls and the symptoms abate. The mild cases usually recover rapidly, the more severe ones may be protracted; ultimate recovery however is the rule.

The disease derives particular interest from the fact that it is easily confounded with enteric fever.

Treatment.—The treatment is entirely symptomatic. The headache may be relieved by compresses; the muscular pains may be controlled by rubbing with some counter-irritating liniment; the bowels should be kept open and during the febrile stage the patient should be kept in bed.

Diet.—The complicating nephritis makes a fluid diet absolutely necessary. When the temperature has fallen and the nephritis has subsided, a gradual return to ordinary diet is proper.

The nursing is to be conducted along the general lines.

TYPHUS FEVER.

Synonyms.—Jail, camp, ship, hospital, putrid or spotted fever, black death.

Definition.—An acute infectious disease characterized by a typical skin eruption, nervous symptoms and a high temperature terminating usually by crisis in

about two weeks. The disease was very common in olden times but is becoming comparatively rare because of the increased attention paid to sanitation.

Causation.—It is most common in young adults but no age is exempt. Filthy conditions, unhygienic surroundings, poor ventilation, etc., favor the occurrence of the disease. Typhus fever is probably caused by a microörganism which has not yet been discovered. The contagion is easily acquired and difficult to destroy; it seems to float in the air and to be given off from the surface of the patient's body; consequently the disease is communicable from person to person and through clothing, bedding, furniture and the like. The contagion cannot be carried through the air from hospitals to dwellings in the vicinity. Typhus patients give off in the breath and from their bodies a peculiar odor, and persons who perceive this most acutely seem to be most apt to contract the disease. If the sick-room is thoroughly ventilated, visitors spending only a few moments with the patient are not likely to become infected. It is believed that the patient's excreta do not spread the disease. Typhus fever is most easily contracted by persons in poor condition and unhealthy surroundings, but few escape if sufficiently exposed. It is unusual for one individual to suffer two attacks.

Course and Symptoms.—The incubation period varies from a few hours to twenty days. These extremes are rare, however, the usual period being from

eight to twelve days. The average duration of the disease is from twelve to fourteen days.

The most noticeable symptoms are fever, headache, mental symptoms and the eruption.

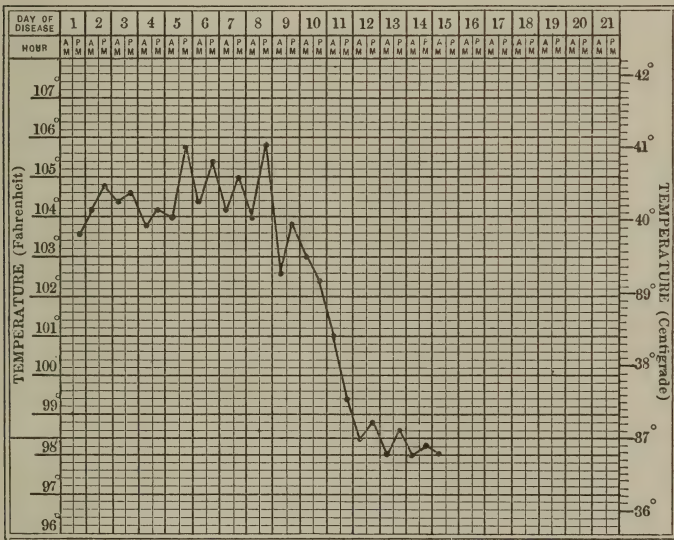
The onset is usually sudden with a chill followed by fever, severe headache and pains in the back and limbs; there may be nausea and vomiting; the bowels are usually constipated. During the first week the face is congested and apathetic, and during the second week the patient's appearance resembles that of the third week of typhoid fever. After the initial chill the temperature rises rapidly and reaches its greatest height (usually 104° to 106° F.— 40° to 41.1° C.) from the fourth to the seventh day. At first the fever is practically continuous, but as the second week begins there are morning remissions.

The pulse is at first rapid (100) and full, later it is likely to become rapid and feeble or it may remain slow and feeble or rapid and feeble throughout the disease.

The respirations are rapid and this rapidity may be increased during the second week as a result of pulmonary complications.

The rash is constant and appears from the fourth to the seventh day and lasts from seven to ten days. There is but one crop and it appears on arms, legs and body, but is most typical on the front of the forearms and shoulders. It is in the form of irregular, slightly elevated, rounded, pinkish blotches from the size of a

pinhead to that of a split pea. Later in the disease the spots become darker in color and the intervening skin may be reddened or mottled. From the eighth to the tenth day small ecchymoses within the blotches, which have now become brownish in color, may appear, and small bluish petechiæ may manifest themselves. These



CLINICAL CHART OF TYPHUS FEVER ENDING IN RECOVERY.

last may persist after the disappearance of the original rash. After the eruption has disappeared desquamation usually takes place. Children, in whom the disease is rarely fatal, sometimes show no rash whatever, and are quite likely to be free from the petechiæ.

The urine is diminished, darkened in color, increased in acidity and is likely to contain albumin and casts.

The marked nervous symptoms such as alternating delirium and stupor, muscular twitching, picking at the bed-clothing, etc., appear in the second week.

In the favorable types of the disease, at the end of the second week the temperature falls rapidly, the symptoms subside, the patient is able to sleep and convalescence is established.

Relapses are rare and bronchitis and broncho-pneumonia are the most frequent complications.

The prognosis of typhus fever is always grave.

Prevention.—The spread of the disease should be guarded against by isolation of the patient and the strictest quarantine. All the excreta, bed-clothing, utensils, the sick-room, etc., should be disinfected as in typhoid fever. It is very important that the apartment should be thoroughly aired for several weeks after having been subjected to the process of disinfection.

Treatment.—The patient should be confined to bed, his diet should consist entirely of fluids, milk, broths and the like, and he should be encouraged to drink copiously of cold water. After convalescence has begun solid diet may be allowed within a few days.

No drug is known which exerts any specific influence upon the disease, but the symptoms are treated as they arise.

It is of the utmost importance that there be an abundance of fresh air in the sick-room. During the last epidemic in New York it was found that those patients bore the disease best who were treated in tents in the open air.

For the fever, if above 102° F. (38.9° C.) cold baths may be given; the bowels should be kept open by mild laxatives; the employment of whiskey or other stimulants may be necessary to combat the heart weakness. For the nervous symptoms various sedatives are indicated.

The nurse should endeavor to spend most of the time, when not in actual attendance upon the patient, near an open window or in fresh air. Otherwise the nursing of the disease should be conducted along the lines laid down for the nursing of febrile disease in general.

YELLOW FEVER.

Definition.—An acute infectious febrile disease evidenced by jaundice, vomiting of blood and extreme prostration. The disease is endemic in the West Indies, Central America and the west coast of Africa. From time to time epidemics have appeared in the southern United States.

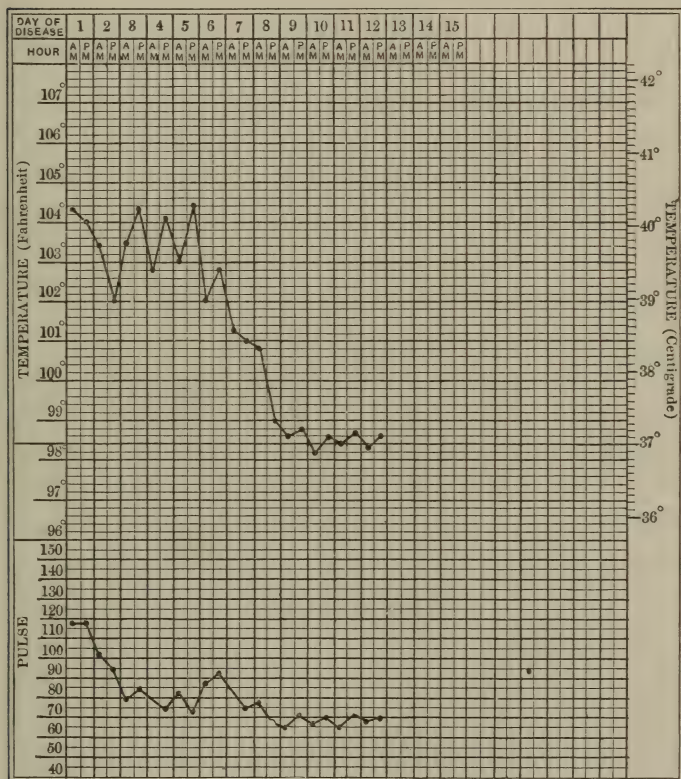
Causation.—The specific germ of yellow fever has not yet been discovered beyond question. It is transmitted to man through the bite of a certain species of

mosquito which has previously fed upon the blood of those ill with the disease. It is not probable that infection is carried in clothing, ships, etc. Young infants and the aged are likely to escape. Whites are more susceptible to the contagion than negroes. Epidemics cease after a frost, as the low temperature kills the mosquitoes. An individual who has suffered one attack is very unlikely to be infected a second time.

Course and Symptoms.—The incubation period varies from three to six days. The invasion of the disease is extremely acute and marks the commencement of

The First Stage.—The onset is marked by chilly feelings or a convulsion with rapid rise of temperature to 102° – 105° F. (38.9° to 40.5° C.). With slight variations the fever lasts from three to four days, falling by lysis. There are severe headache and general pains, sore-throat, vomiting, restlessness and great prostration. The face is flushed, the eyes reddened and watery and there is dread of bright light. The pulse is weak and slow in proportion to the height of the temperature and may become slower than normal before the fever declines. The tongue is red and dry and the gums are sore. The patient vomits, first the contents of the stomach, then mucus, bile and blood. The bowels are usually constipated but the stools are not light in color. The urine is scanty, high-colored, and usually contains albumin. About the second or third

day the whites of the eyes become yellowish and later jaundice appears over the entire surface of the body.



CLINICAL CHART OF A YELLOW FEVER PATIENT showing the pulse typically slow in comparison to the height of the temperature.

The Second or Stage of Calm appears when the fever declines; the symptoms gradually disappear and the

patient goes on to recovery or after a period lasting from a few hours to a day or two he becomes worse and continues to

The Third Stage, which is marked by extreme prostration, normal or elevated temperature, soft and very slow pulse, and hemorrhages. Bleeding into the stomach and the vomiting of the partly decomposed blood (black vomit) occurs, and tarry stools may be observed. Hemorrhages from the nose, gums, uterus, kidneys and into the skin are not infrequent. The jaundice persists and there may be suppression of the urine followed by convulsions and death due to uremia.

If the patient recovers the symptoms slowly ameliorate and prolonged convalescence takes place.

Complications and relapses are rare.

The disease may vary from the *regular type* and be very mild, lasting but two or three days, and showing none of the usual symptoms; or it may be *malignant* with little or no rise in temperature and early stupor or coma followed in three or four days by death.

Prevention.—Quarantine, in the light of present knowledge of the method of transmission of yellow fever, seems unnecessary, but as a precaution it is best to isolate the patient.

Prevention consists chiefly in protection from and destruction of the mosquitoes. How effectually this prevents the disease is evidenced by its rarity in Havana since proper steps have been taken in this direc-

tion. Mosquitoes in dwellings may be destroyed by sulphur fumigation and prevented from entering by screens.

Patients suffering from the disease should be surrounded by netting. Curative and preventive inoculation by various serums seems to be of little use. Even though it seems improbable that yellow fever can be transmitted by means of clothing and the like it is wise to disinfect the patient's apartment and all articles with which he has come in contact according to the methods employed after smallpox and the other infectious diseases.

Treatment.—The patient should not be moved after the onset of the disease and strictest quiet must be enjoined. If the patient cannot urinate while lying in bed he must be catheterized. All body and bed linen must be changed with the utmost care to disturb the patient to the least possible degree.

The symptoms should be treated as they arise. During the active stage all food and medicine must be given per rectum or hypodermatically, never by the mouth.

Hypodermatic injections of morphine upon the physician's prescription and cracked ice may be given for the vomiting and a mustard plaster or hot poultice may be applied to the abdomen. No purgatives should be given. Suppression of the urine may sometimes be relieved by hot packs over the region of the bladder,

high rectal enemata of normal salt solution and alkaline diuretics. The hemorrhages are difficult of control.

Diet.—During the acute stage all food should be given per rectum; during convalescence the greatest caution is to be observed in feeding, for solids given too soon are likely to provoke hemorrhage. No solids should be given for at least ten days after the symptoms have subsided. At first the patient may have peptonized milk or kumyss, a drachm every half hour, then beef juice may be allowed, also whites of eggs and infant foods, broths and gruels. Gradually may be added the various semi-solids, junket, cereals, etc., and so on till the patient is strong enough to tolerate solid diet.

The nursing of yellow fever requires no other instructions than those given in the chapter on fever nursing in general.

INFLUENZA.

Synonyms.—Epidemic catarrhal fever; la grippe.

Definition.—An epidemic febrile disease characterized by catarrhal inflammations of the various mucous membranes, prostration and a tendency to involvement of the digestive and nervous systems. Influenza occurs from time to time in wide-spread epidemics.

Causation.—The disease is more common and severe in adults than in children, and though it pre-

vails at all seasons, it is more fatal in the colder months. Bad sanitary surroundings do not seem to affect its incidence and persons who have suffered from the disease seem more prone to contract it than others. The specific cause is a bacillus which is found in the exudations from the inflamed mucous membranes—especially in the nasal discharge and sputum—and in the blood.

Course and Symptoms.—The incubation period is from a few hours to several days; the onset is sudden with a chill followed by a rise in temperature— 101° to 104° F. (38.4° to 40° C.)—severe headache and muscular pains; there may be nausea and vomiting together with the other symptoms usual in beginning febrile disease. The fever lasts from two to six days and may be of remittent or intermittent type; the pulse is rapid and in old persons may be feeble. During the course of the disease various skin eruptions may appear. As the temperature approaches normal, sweating is likely to occur and the symptoms gradually subside.

The disease manifests itself in one of three main types, which are very likely to merge into one another.

The Catarrhal Type is characterized by symptoms referable to the mucous membranes of the respiratory tract and conjunctivæ. There are sneezing, nasal discharge, a feeling of fulness in the head, sore-throat, hoarseness, and the eyes congested. The cough is at first dry, but soon muco-purulent sputum appears; rarely it may be blood-stained. Bronchitis and pneu-

monia of severe form are not infrequent complications. Recovery is slow and the cough may persist for weeks.

The Nervous Type begins with severe headache, ringing in the ears, general muscular pains and extreme depression and prostration; rarely there may be convulsions. In some cases there are symptoms resembling those of meningitis, such as sensitiveness to light and sound, pain in the back of the head, and stiffness of the muscles of the neck. Delirium sometimes occurs. The nervous symptoms gradually subside in the course of a few days, but during convalescence there is marked tendency to mental depression and neuralgia in various parts of the body. True neuritis is a frequent sequel.

The Gastro-intestinal Type is evidenced by vomiting, cramps in the abdomen, distention and diarrhea; the symptoms may be so severe as to suggest peritonitis or appendicitis. Jaundice may be present.

Complications.—The most common of these are bronchitis, pneumonia, which is usually of severe character, and neuritis. Various other complications such as pleurisy, inflammations of the heart and pericardium, conjunctivitis and otitis are less frequent.

Influenza in old persons or those previously weakened by disease is always serious and often fatal.

Prevention.—During epidemics it is wise to avoid undue exposure to cold and wet and to keep the body

in as hygienic a condition as possible. If there is any tendency to nasal or throat inflammation the daily use of an antiseptic spray is advisable.

Quarantine of patients suffering from the disease is hardly necessary, but all needless association with sufferers is to be avoided.

Treatment.—At the onset the patient should go to bed and an attempt may be made to shorten the disease by means of free opening of the bowels and the induction of sweating by the administration of a hot pack and hot drinks.

If the disease continues despite these measures, treatment calculated to relieve the symptoms should be undertaken. The pains may be controlled by hot or cold applications and the administration of phenacetin when ordered by the physician; the nose and throat inflammations should be treated with antiseptic sprays or applications. In cases with marked prostration heavy stimulation may be necessary.

The Diet during the febrile stage should be of fluids and it is very important that the patient's nutrition be maintained. As convalescence begins semi-solids may be allowed, with solids to follow as soon as they are tolerated; the patient should be encouraged to eat as much as he can assimilate. Various tonics such as malts, fat emulsions and cod-liver oil are useful at this juncture.

In nursing there need be no departure from the usual principles.

MALTA FEVER.

Synonyms.—Mediterranean fever; Neapolitan fever; rock fever; undulant fever.

Definition.—An infectious fever characterized by an irregular temperature, sweats, diffuse pains and a tendency to relapse.

Causation.—The disease is endemic in Malta and epidemics occur from time to time in the countries bordering on the Mediterranean; it is occasionally seen in tropical America. It attacks young adults most frequently and prevails chiefly in summer and in unhygienic environments. Its specific cause is the *bacillus melitensis*, which is believed to enter the body upon the inspired air.

Course and Symptoms.—The incubation period lasts from a few days to two weeks. The invasion is slow, with headache, restlessness, prostration, constipation and sometimes bloody stools. The temperature is slightly elevated and the spleen is enlarged. The temperature, after remaining high for from one to four weeks, falls to normal and remains there for a period of from one to three days when a relapse, often of a more severe character than the first attack, takes place. The symptoms are increased in severity, the temperature, though intermittent, is high, there may be delirium

and diarrhea. These symptoms may last five or six weeks. A second temporary convalescence is followed by a second relapse in which severe joint pains are usually present. After the second relapse the patient may go on to recovery or a third relapse may ensue after an afebrile period lasting several months. The mortality is not great, death when it takes place being due to the continued high temperature or to exhaustion.

Complications.—Broncho-pneumonia and pleurisy sometimes occur; arthritis and orchitis are more rare.

Prevention consists in avoidance of the localities in which the disease prevails. So far as we are at present aware little else can be done in this regard.

Treatment is stimulative and supportive. High temperature may be controlled by bathing, the joint pains by applications of heat or cold.

Diet.—The diet applicable to typhoid fever is suitable in this disease.

The nursing is to be carried out along the usual lines.

MOUNTAIN FEVER.

Synonyms.—Spotted fever; tick fever.

Definition.—An acute infectious disease characterized by a typical skin eruption, recurring chills and high fever.

Causation.—The disease occurs in the Rocky Mountain regions of Idaho and Montana. It attacks

all ages and both sexes, and is most frequently observed during the months from March to July. Its specific cause is a microörganism resembling that of malaria, which is conveyed to the patient through the bite of a certain form of tick. This organism exists in moderate numbers in the blood of patients suffering from the disease.

Course and Symptoms.—The period of incubation is from three to ten days. The period of invasion is marked by malaise; the onset by a distinct chill, which recurs at intervals during the disease, decreasing in severity, headache, pains in the bones, and prostration. The initial chill is followed by a rapid rise in temperature which by the second day reaches 103° or 104° F. (39.5° to 40° C.). It gradually increases to a maximum of 105° to 107° F. (40.5° to 41.6° C.) from the fifth to the seventh day. The temperature is highest at night, being slightly lower in the morning. About the middle of the second week the fever begins to fall by lysis, reaching normal on the fourteenth day. Occasionally the temperature falls to normal or below a few hours before death. The bowels are usually constipated; there is often a bronchial cough. The tongue and facial expression resemble those of typhoid fever, and in severe types of the infection, nervous symptoms resembling those of that disease are to be expected.

The pulse at the onset is full and strong, becoming rapid and weak as the severity of the disease increases.

The appetite during the first week of the disease is often good. At the beginning of the second week nausea and vomiting appear and in fatal cases may continue. The spleen is enlarged. The respiration is rapid and regular, but shallow. It may reach 60 but is usually about 40.

As a rule the prognosis is good with proper care.

The eruption appears on the second to the fifth day, first upon the wrists, ankles or back. Thence it spreads, covering the whole body. It may progress so rapidly as to cover all the skin in twelve hours, but usually the height of the eruption is reached in one or two days. The rash is frequently present upon the scalp, palms and soles. It at first consists of rose-colored, circular spots from the size of a pinhead to that of a small pea. They are not elevated and in the beginning disappear on pressure; they may be tender. They quickly become permanent and dark-blue or purplish in color and increase in size until the skin assumes a marbled appearance. Sometimes the eruption consists of small brownish spots which give a speckled appearance to the skin.

Desquamation begins during the third week and as the fever falls the spots fade but may not wholly disappear for weeks or months. There is usually jaundice. The skin may become gangrenous over the elbows, fingers, toes or scrotum.

Prevention.—The districts in which the disease occurs should be avoided during those months in which mountain fever is prevalent. Measures should be taken to avoid tick-bites, but when these take place the insect should be removed at once by the application of turpentine, ammonia or kerosene, and the wound cauterized with pure carbolic acid.

Treatment.—The use of quinin in large doses hypodermatically has given favorable results in the few cases in which it has been employed. Otherwise the treatment of the disease is purely symptomatic.

The Diet and nursing suitable to typhoid fever may be employed with advantage in mountain fever.

The nursing should be conducted in accordance with the general principles.

ACUTE MILIARY TUBERCULOSIS.

Synonyms.—Acute tuberculosis; acute general tuberculosis.

Definition.—An acute febrile disease characterized by the formation of miliary tubercles in various organs of the body and accompanied by constitutional symptoms closely resembling those of typhoid fever.

Causation.—Acute tuberculosis may follow localized tuberculosis of lungs, bones, joints or glands, or occur in individuals in whom tuberculosis in any form has not been previously recognized, although it is prob-

able that these patients have had undemonstrated tuberculosis of some organ or tissue. The specific cause of the disease is the tubercle bacillus, which in some manner has entered the circulating blood in considerable number and has been deposited in the various organs by means of this medium.

Course and Symptoms.—The disease resembles typhoid fever to so marked an extent that differentiation may be very difficult. The onset is slow with increasing weakness, headache, nausea, constipation and fever. The temperature is irregular, being low in the morning and high at night— 102° – 105° F. (38.9° – 40.5° C.)—and is accompanied by sweating; the pulse is rapid (140–150) and the respirations are accelerated (36–70); there may be blueness of the lips and extremities. Cough is usually present; the sputum is scanty, mucoid and may or not contain the bacilli. Fever sores upon the lips are not rare. Otherwise the symptoms so resemble those of typhoid fever as to need no further description in a work of this character. The disease is invariably fatal.

Varieties.—There are several varieties of the infection:

(a) *The Typhoid Type*, in which many of the nervous symptoms of typhoid fever are present.

(b) *The Meningeal Type*, in which there are hypersensitiveness of all the senses, convulsions, stiffness and

pain in the back of the neck and finally coma with paralyses.

(c) The *Pulmonary Type*, which is characterized by distressing cough, extreme shortness of breath and blueness of lips and extremities.

(d) The *Abdominal Type*, in which there are distention and tenderness of the abdomen.

Treatment is entirely symptomatic. The high fever may be controlled by bathing, the heart weakness combated by stimulants, and the cough and nervous symptoms relieved by sedatives. Otherwise the treatment of the symptoms of typhoid fever is applicable.

The Diet and nursing should also be based upon the principles already described for typhoid fever.

CHRONIC PULMONARY TUBERCULOSIS.

Synonyms.—Chronic phthisis; consumption.

Definition.—A chronic disease characterized by progressive emaciation, obstinate cough with the expectoration of muco-purulent matter and sometimes of blood, fever and night sweats.

Causation.—The disease is predisposed to by an hereditary tendency, by unhygienic methods of life and unhealthful surroundings. Its specific cause is the tubercle bacillus which reaches, either through the blood stream or upon the inspired air, the interior of the lungs and there causes a tuberculous inflammation.

Course and Symptoms.—Sometimes the disease gives few recognized symptoms until the inflammation

in the lungs has made considerable progress, but usually the patient becomes aware that his condition is not as it should be by the appearance of persistent cough, of pulmonary hemorrhage, of progressive loss of flesh and strength, of chilly and feverish feelings or of night sweats.

The temperature of the disease is not constant; it may remain normal for considerable periods but usually it shows a remittent curve, being about 100° F. (37.8° C.) in the morning and rising in the afternoon to 102° or 103° F. (38.9° – 39.5° C.); with the fever there are chills and sweats, clammy perspiration at night being a feature of the disease.

The pulse is moderately increased in rate and as the prostration increases becomes progressively more feeble; both pulse and respiration are quickened by slight exertion. Usually the respiration, even when quiet, is faster than normal, but the patient seldom complains of shortness of breath.

As the disease goes on the patient gradually loses flesh, his cheeks become sunken and flushed (the "hectic flush"); the color of the skin is otherwise pale or it may be bluish over the extremities; the spaces above and below the clavicles are sunken, the ribs are prominent, and the abdomen hollowed.

The appetite is poor, the tongue is coated, and there may be nausea and vomiting caused by the swallowed sputum. Late in the disease there is likely to be diar-

rhea due to a complicating tuberculous inflammation of the intestinal lining.

The cough may be dry or there may be muco-purulent sputum in greater or less quantities. A considerable quantity of purulent sputum may be raised upon the occasion of the rupture of an abscess in the tissues of the lung. The sputum may be streaked with blood and at times hemorrhages may take place, not rarely so profuse as to end in death. The sputum contains the tubercle bacilli in greater or less number.

There may be pain in the chest due to a complicating pleurisy.

Tuberculous laryngitis accompanied by hoarseness, a laryngeal cough, pain and difficulty in swallowing is a common complication.

In women menstruation is irregular or stops entirely.

A feature of the disease is the fact that the patient is cheerful and no matter how ill he may be is very hopeful of recovery.

Prevention.—Persons with an inherited tuberculous tendency should be careful to avoid exposure to cold and wet and endeavor to lead as healthful lives as possible.

Since the sputum of this disease contains the tubercle bacilli the greatest care should be exercised in its disposal.

It should always be expectorated when indoors into paper cups which may afterward be burned or into

vessels containing a disinfectant solution (1 to 10 carbolic acid solution or 1 to 2,000 mercury bichlorid) and when the patient is out of doors he should be provided with an appropriate pocket flask. If cloths should be used they must be burned as soon as possible. Great care should be taken by the patient to prevent the hands, face and clothing from becoming contaminated by the matter coughed up. If they do become soiled they should be washed at once with soap and hot water. When coughing or sneezing, particles of moisture are expelled which may contain the bacilli, consequently a cloth, which must subsequently be burned, should be held before the mouth during these acts. Male patients should always keep the face cleanly shaven.

All the patient's personal and bed linen should be handled as little as possible when soiled and should be placed in water until ready for washing. His apartment should be subjected to periodical disinfection according to one of the usual methods.

When the patient is too weak to properly dispose of his sputum all utensils and clothing which become contaminated must be cared for as described in the chapter upon disinfection, and fumigation of rooms previously occupied by tuberculous patients should undergo the process usual after the infectious diseases.

The stools of patients with tuberculous disease of the intestine may also contain the bacillus and these with

all articles contaminated by them should be disposed of as set forth in Chapter IV.

Attendants should avoid standing in front of the patient when he coughs, for minute particles of sputum containing the bacilli may be by this act projected into the atmosphere and infect those with whom they come into contact.

Treatment.—The object in the treatment of this disease is to improve the general bodily nutrition. The patient's apartment should be large, airy, sunny and without carpet or draperies. He should spend as much time as possible in the outdoor air, in bad weather being properly sheltered and wrapped during his airing. At night the room should be freely ventilated, no matter how cold the weather, but avoidance of draughts is necessary.

Exercise in moderation, but not when it tires the patient nor when fever is present, may be indulged in. When the disease is advancing rapidly, when there is marked fever, and when complications arise, he should be kept in bed.

When in the open air the patient should periodically draw several long breaths through the nose so as to thoroughly aerate the lungs. A sponge bath with water at a moderate temperature should be given daily. The underclothing should be of wool and of moderate weight. Pajamas of flannel are to be preferred to the ordinary night gown.

The drugs most used in the treatment of this disease are cod-liver oil and creosote or some of its derivatives. The latter is frequently given by inhalations from a mask made of perforated metal which may be worn as long as desired. The appliance contains a sponge which is moistened with a mixture of equal parts of creosote, chloroform and alcohol. Tonics are often useful.

The night sweats may be controlled by the administration of various drugs, or by waking the patient about four o'clock in the morning and giving him a glass of warm milk containing a little whiskey. This procedure possesses the additional benefit of supplying a little extra food.

If the sputum is foul the inhalation of the vapor of a few drachms of turpentine added to a kettle of steaming water is beneficial.

Pulmonary hemorrhage should be treated by insisting upon absolute quiet in bed and the application of an ice bag to the chest.

The internal administration of calcium chlorid, suprarenal extract and subcutaneous injections of gelatin solution have been advocated. No medication, however, should be administered unless ordered by the physician.

For patients able to travel a change of climate is frequently beneficial. A climate which agrees with the patient under treatment should be chosen. Some do

best upon the seashore, others at high altitudes. There is no way of determining in advance whether or no a certain climate will prove beneficial.

The Diet in chronic phthisis is a most important consideration. The secret of feeding tuberculous patients is to give them light, nutritious, easily digested food and to feed them early and often. The patient should have at least three hours in which to digest the heavier meals so that the stomach may be emptied before the next feeding. At seven o'clock in the morning the patient should receive a glass of warm milk containing a tablespoonful of strong French coffee. If the previous night has been an exhausting one, whiskey may be substituted for the coffee. Before being added to the milk, the spirit should be diluted with an ounce of water, lest it cause coagulation and render the mixture indigestible. Breakfast should be taken about nine o'clock and may consist of eggs, cooked in any way except by frying. If the patient insists upon having them fried, olive oil or butter must be used instead of lard. Bread, toast or cold rolls with butter, milk and coffee may complete the meal.

About eleven o'clock the patient receives a second breakfast consisting of a cup of cocoa from which the fat has been extracted, or coffee, with bread and a little soup or beef extract. An egg-nog is permissible and kumyss or matzoon is often acceptable.

The dinner should be served about one o'clock and

may consist of any kind of fresh meat, but it must not be fried. Potatoes, fresh vegetables, fruits and puddings may also be allowed. Coffee, tea or possibly a bottle of light beer may be added.

About four in the afternoon the patient should take a little meat extract with toast, and about five o'clock a little more should be given. About seven o'clock in the evening comes supper consisting chiefly of farinaceous food with the addition of various jellies, beef extracts and gruels. If the patient is awake at eleven a cup of milk, hot soup or gruel may induce sleep.

Patients, whose temperature rises in the afternoon should usually take no alcohol after the one o'clock meal. In other cases the only alcohol permissible in the afternoon is light beer or possibly stout at bed time.

Especially in patients with complicating tuberculous laryngitis and in others when indicated, forced feeding by gavage (Debove) accomplishes good results.

The food is prepared as follows: Lean meat from which all the gristle and tendon and much of the fat have been removed should be used. The meat should be chopped fine and dried in an oven at 150° F. (65.6° C.) until it has become absolutely dry. Now the temperature of the oven should be raised to about 170° F. (76.7° C.). When the meat has been thoroughly dried, which takes a number of hours, it should be ground in a mortar and sifted. Six pounds of raw beef treated in this way furnish about one pound of the beef powder.

In administering the food a stomach tube—not a stomach pump—is used. This tube should be of soft rubber, of three eighths to one half an inch outside diameter and with an opening both at the side and at the extremity of its tip; a glass funnel should be attached to the other extremity. At about sixteen inches from the tip of the tube should be a mark so that we may know when the stomach has been reached.

Before passing the tube it should be lubricated by pouring upon it a few drops of glycerin which should be allowed to run down its outside to the tip. Then grasping the appliance between thumb and forefinger at about six inches from its tip, the nurse should stand directly in front of the patient and as the mouth is opened pass the tube along the dorsum of the tongue. As the tip reaches the back of the throat the nurse should rotate it and tell the patient to swallow. As he does this the tube should be quickly and gently passed down the esophagus until it reaches the cardiac end of the stomach; as the tube passes this point a distinct sensation is perceived by the nurse. Care should be taken that the appliance is not passed into the trachea instead of into the esophagus. If this accident happens air will be breathed through the tube and the patient will experience difficulty in respiration. In the event of such an occurrence there is nothing to do but to withdraw the tube and begin over again. In patients with very sensitive throats it may be necessary to employ

a spray of cocain solution (four per cent.) or to administer bromides before the procedure.

The tube being in the stomach, the organ should be washed, in order to cleanse its wall of mucus, by pouring in a pint of artificial Vichy water. After washing, the Vichy should be withdrawn by lowering the funnel when the wash water will flow out by siphonage.

The stomach having been washed the nurse should proceed with the feeding of the patient by pouring into the organ through the tube three-quarters of a pound of the beef powder to which has been added three times as much milk (two and one fourth pints). This is to be left in the stomach. At first such a meal should be given twice a day and the amount gradually increased until the patient takes from one to one and one half pounds of the powder and four or five pints of milk per day. If there is trouble in digesting this the milk should be omitted and a little diluted hydrochloric acid added to the meat powder. In no case should the hydrochloric acid be used if milk forms a part of the feeding.

In the late stages of chronic phthisis when the patient's digestion will not permit the administration of solid food and weakness forbids feeding by gavage we must have recourse to a diet consisting of milk, soups, gruels and the like.

The nursing in other regards is to be conducted as usual in febrile diseases.

CHAPTER VI.

INFECTIONS OF CONTINUED TYPE WITH LOCAL MANIFESTATIONS.

Pneumonia: Diphtheria: False Diphtheria: Acute Articular Rheumatism: Erysipelas: Septicemia: Puerperal Fever: Pyemia: Mumps: Bubonic Plague.

PNEUMONIA.

Synonyms.—Pneumonitis; fibrinous pneumonia; croupous pneumonia; lung fever.

Definition.—Pneumonia is an acute infectious fever characterized by inflammation of the lungs.

Causation.—The disease is common in all countries and occurs at all ages; it is particularly fatal in infancy, old age and alcoholic individuals. It is most frequently seen in the cold and damp months. Exposure to cold and wet, alcoholic excess, previous catarrhal affections of the lungs and disease of the heart predispose to the infection. During epidemics of influenza pneumonia is likely to be prevalent and attended with an increased mortality. Several attacks in the same person are not infrequent.

Various bacteria are found in the sputa of pneumonia patients, the most common of which are the *micrococcus lanceolatus* or diplococcus of Fränkel, the *ba-*

cillus pneumoniae of Friedländer and ordinary staphylococci and streptococci. It is probable that pneumonia is in a sense infectious, for although physicians and nurses seldom contract the disease from association with patients, it is not uncommon for several cases to occur in the same house or to develop in a hospital ward following the admission of a patient suffering from the infection. The sputum probably is the means through which the contagium is carried.

Course and Symptoms.—The incubation period is unknown, but in all probability is from a few hours to three days. The onset as a rule is sudden with a marked chill followed by a rapid rise in temperature, sharp pain in the side, cough and shortness of breath; the pulse is rapid and tense; there is extreme prostration. A frequent early symptom is herpes of the lips or nostrils. The cough is at first dry but after two or three days a blood-stained expectoration appears—the so-called “rusty sputum”—which is so viscid that it adheres firmly to the sides of the containing vessel; in certain cases the sputum is not so viscid and dark brown—“prune juice sputum.” After the temperature has fallen the sputum becomes lumpy and yellowish or greenish in color. The pain in the chest is severe and knife-like in character, is usually felt in the axilla over the affected lung, and is increased upon breathing or coughing. It tends to become less marked as the disease progresses. The patient is likely to be

more comfortable when lying upon the affected side, because in this position less motion of the involved lung is possible.

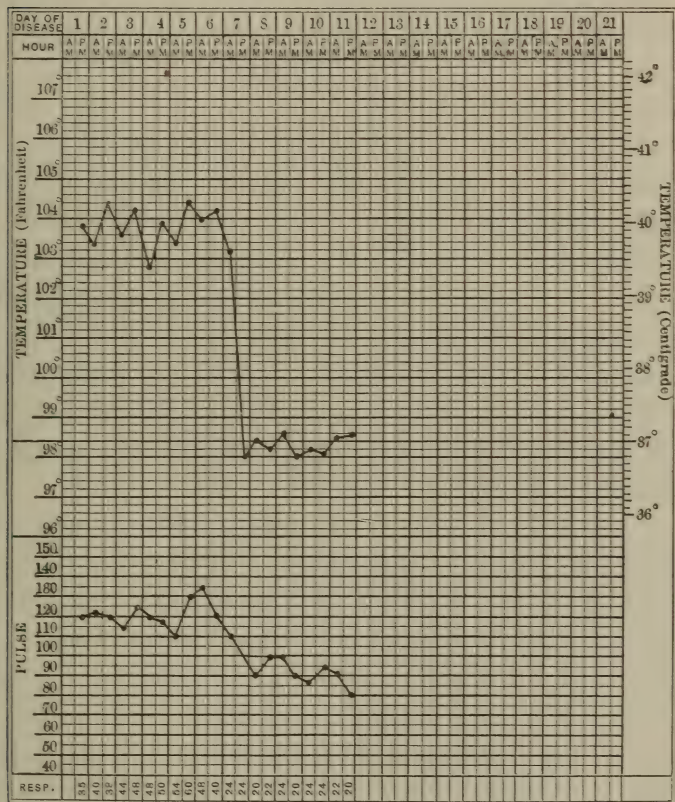
The pulse is rapid and full at the onset of the disease but not so rapid as to retain the normal pulse-respiration ratio, later it becomes weaker, irregular and perhaps dicrotic. There is always danger of heart failure.

The shortness of breath is a prominent symptom and may be accompanied, especially in children, by movement of the nostrils. The respirations are shallow—from 30 to 50 per minute—and in children even more rapid than these figures. In some cases expiration is accompanied by a grunting sound. Blueness of the lips and extremities may be present with extreme respiratory difficulty. Nervous symptoms such as stupor, and delirium are common. In alcoholic cases delirium tremens is a frequent complication.

The temperature reaches its highest point within a few hours after the onset and remains elevated, with slight morning remissions, until the crisis—which usually takes place upon the seventh day—when it falls within a few hours to normal. With this occurrence the other symptoms abate. In children and old persons defervescence is more likely to take place by lysis as is also the rule in cases protracted beyond the tenth day.

Complications.—*A dry pleurisy* accompanies all cases of pneumonia in which the inflammation extends to the surface of the lung. *Pleurisy with effus-*

ion is not infrequent and may, especially in children, go on to *empyema* in which latter case chills, sweating



CLINICAL CHART OF ACUTE LOBAR PNEUMONIA showing pulse and respiration.
Defervescence upon the seventh day of the disease.

and a remittent temperature should lead us to suspect the presence of pus.

Bronchitis may make the disease more severe and increase its exhausting effects.

Pericarditis may occur and is due to an extension of the inflammation to the membranes surrounding the heart.

Endocarditis is not rare.

Jaundice may occur, especially in alcoholic cases. With this complication the sputum may be tinged yellow or green.

Meningitis may exist as a complication and is evidenced by headache, stiffness of the neck, unequal pupils, stupor or delirium.

Varieties of the Disease.—*Wandering Pneumonia* is the term applied to that variety of the disease in which different areas in the lungs become successively inflamed.

Typhoid Pneumonia has no connection with typhoid fever but is the term applied to that type of the disease in which the patient is rapidly overcome by the toxemia. The temperature may remain low or it may reach a high level. The nervous symptoms are marked and the tendency to heart failure is great.

Alcoholic Pneumonia occurs in individuals who use liquor to excess. It is typified by a severe course, and a tendency to delirium tremens. It is very fatal.

Pneumonia in Infants.—The onset may be marked by a convulsion. The temperature is irregular and usually falls by lysis. The mental symptoms are

severe and, though there may be cough, there is usually no expectoration, since if it be present at all it is usually swallowed.

Pneumonia in Old Persons is characterized by a protracted course and moderate temperature which as a rule falls by lysis; the prostration is extreme, the pulse is weak, the respiration shallow. This variety is usually fatal.

Prevention.—All sputum should be disinfected and after the disease is over the sick-room should be fumigated after the usual manner.

Treatment.—The patient should be kept in bed and absolutely quiet in a well-ventilated room at a temperature of about 70° F. He should not be allowed to rise or to lift his head, under any circumstances. The bowels should be kept open throughout the course of the disease.

A pneumonia jacket of cotton batting and oil-silk fitted to the chest may make the patient more comfortable. Poultices or ice-bags applied to the inflamed lung do not influence the disease, but may relieve pain. The former may be made of antiphlogistine or flax-seed.

The antiphlogistine may be used by applying several turns of a three- or four-inch roller bandage to the chest, spreading the substance in a thin layer upon that portion of the bandage which covers the affected portion of lung and covering it with further turns of the bandage.

A flax-seed poultice is made by mixing flax-seed meal and boiling water in proper proportions in a bowl. When thoroughly beaten together the mixture should be spread to the thickness of one half an inch upon a piece of linen slightly larger than the surface to which the application is to be made; a border of linen must be left all around the mixture of flax-seed meal and water when it is spread; this is to be folded over the edge of the poultice when completed. The poultice should be applied as hot as the patient can bear it, but the nurse must take care not to burn the skin. In renewing poultices it must be remembered that a surface to which continuous hot applications have been made will not bear a poultice so hot as that first applied. If the poultice cannot be applied immediately after it has been made it should be kept warm between two plates placed over a vessel of boiling water, *not* in the oven.

The fever may be controlled by sponging with alcohol and water and a luke-warm tub bath is an excellent measure in the case of children.

Few drugs have any influence upon the course of the disease. The use of creosote carbonate however is frequently followed by beneficent results. It should be given, however, only upon the physician's order. We endeavor to keep the pulse between 90 and 100 and of good strength. With this the respiration will be easier and the tendency to cyanosis diminished. The drugs best suited to this purpose are alcohol, and other

cardiac stimulants. When the dyspnea is marked and the blueness of lips and extremities extreme the administration of oxygen is valuable. It may be given continuously or at intervals and in cases which it does not benefit it certainly does no harm.

Treatment other than that described above should be calculated to relieve the various symptoms as they arise.

After convalescence has begun the patient should be kept in bed for a week and given general tonic treatment.

The Diet during the febrile stage should be entirely of fluids, milk, broths, gruels, etc., and should be administered either through a tube or by means of a cup with a spout adapted to the purpose.

The nurse should above all things be quiet and carefully observant of the slightest changes in the patient's condition. In this disease, as in few others, thoroughly efficient nursing is absolutely necessary.

DIPHTHERIA.

Synonym.—Putrid sore-throat.

Definition.—Diphtheria is an acute infectious febrile disease, occurring sporadically and as an epidemic and marked by inflammation with the formation of a false membrane in the upper air passages.

Causation.—It occurs chiefly in children, is rare after sixteen years of age and is most common in the

colder months. The disease is predisposed to by the presence of adenoids and enlarged tonsils. It is of most frequent occurrence in unsanitary surroundings, due to the fact that these cause general ill-health and lessen the resisting power of the body. The specific cause of the infection is the Klebs-Loeffler bacillus which grows in the false membrane. The bacilli enter upon the inspired air, upon substances conveyed to the mouth or by direct contact with an abraded surface; they are not borne upon sewer-gas or emanations from unclean drains, etc. The disease is very contagious for the distance of a few feet, but its poison is not very diffusible, consequently it is quite possible to confine it to a single room. The contagium may be carried long distances in clothing, etc., and may be transmitted by pet animals—cats in particular. Certain persons seem to be insusceptible to the infection, for the bacilli have been found in the throats of healthy individuals. Pieces of membrane coughed up by patients may infect physicians or nurses or be carried by them to a third person. In most cases the ordinary pus germs are found to co-exist with the Klebs-Loeffler bacilli. One attack seems to render the individual more susceptible to further infection.

Course and Symptoms.—The incubation period is usually from two to three days, rarely as long as a week; the onset is marked by chills or convulsions followed by a rise in temperature to 100° or 102° F.

(37.8° to 38.9° C.); rarely fever may be absent throughout the whole course of the disease. The throat is sore, swallowing is painful and hoarseness due to laryngitis may be present; there are headache, bodily pains, nausea, vomiting and prostration; the tongue is coated and the breath foul. The severity of the symptoms is usually in proportion to the extent of the local inflammation. The pulse is rapid and, throughout the disease and during convalescence, there is great danger of heart failure of very sudden or gradual onset. Shortness of breath is common as a result of obstruction of the air-passages. The urine is scanty, high-colored and often contains albumin and casts.

The Malignant Variety.—Cases of this type appear during every epidemic, usually in individuals whose condition is poor. Such cases are marked by prostration so severe that death may take place before the membrane appears; in other cases the membrane forms very rapidly, the febrile movement is absent, there are extreme prostration and heart-weakness, the patient may become delirious or comatose and death may supervene within a few days.

The membrane may appear at any of the following situations:

The Pharynx and Tonsils.—The tonsils and pharynx are red and swollen. Upon them are one or two small, grayish, membrane-like patches which rapidly increase in size, the uvula becomes inflamed and sometimes

edematous; the glands in the neck become enlarged but not tender. The membrane spreads over the back of the throat and is grayish or yellowish in color; after about seven days it begins to disappear and within a few days is entirely gone. With its disappearance the symptoms clear and convalescence begins.

The Larynx.—When this situation is involved the constitutional symptoms are similar to those described, with the addition of marked hoarseness, noisy breathing and a croupy cough. In some cases the voice may be lost and as the membrane spreads, the difficulty in breathing becomes extreme; the lips become blue and the patient's expression very anxious. Bits of membrane may be coughed out, but usually this gives no permanent relief, for new membrane forms. In severe cases of this type all the symptoms become accentuated, lung complications may occur and death is not unusual.

The Nose.—In nasal diphtheria there is a thin and sometimes very irritating discharge from the nostrils, which soon becomes brownish in color and may contain blood; the patient snuffles, sneezes and, if the nose is entirely occluded, breathes through the mouth. The inflammation may extend to the ears and eyes; the glands beneath the jaw are swollen. This type varies in severity but is as a rule to be dreaded.

The membrane may involve any two or all of the above situations.

Complications.—*Heart Failure* is not rare and may cause the sudden death of the patient.

Nephritis of mild or severe character is not uncommon.

Pneumonia due to the inhalation of bits of membrane may occur.

Paralyses are frequent sequels of diphtheria and may appear even late in convalescence. They most usually affect the motor nerves supplying the muscles of the palate, the eye, the vocal cords, or the limbs. Such paralyses are seldom permanent.

The diagnosis of the disease in poorly marked cases may be impossible without bacteriological examination, consequently it is advisable that the nurse should be familiar with the technique of taking cultures from the throat. A culture outfit, consisting of a tube of solidified blood serum and a swab encased in a sterile tube, is furnished for this purpose by the health boards of certain cities. The patient should be placed in a good light and, if a child, firmly held. The swab should be rubbed against the suspicious area in the nose or throat by revolving it between finger and thumb, then, being careful that it come into contact with nothing else, it should be gently rubbed over the surface of the serum in the culture tube; care should be taken not to break the surface of the serum. The swab should then be returned to its tube and both tubes stoppered with their cotton plugs. The culture then is placed in an incubator for some hours and finally examined microscopically. Throat cultures should not be taken directly

after antiseptic applications have been made to the inflamed surface.

Prevention.—Since we know the cause of diphtheria and its mode of transmission, we should be able to do much to prevent its spread. The following is a condensation of the rules concerning the disease laid down by the New York Health Department.

If possible one person should take entire charge of the patient and no one else except the physician should be allowed in the sick-room. The nurse should hold no communication with the rest of the family, who should not receive or make visits during the illness. Discharges from nose and mouth must be received on cloths which should be immediately immersed in carbolic acid solution (six ounces of pure carbolic acid added to one gallon of hot water and diluted with an equal quantity of water). All handkerchiefs, towels, bed linen, clothing, etc., that have come in contact with the patient, after use must be at once immersed without removal from the room in the above solution. These should be soaked for two or three hours and then boiled in water for one hour.

The greatest care should be taken in making applications to the throat and nose lest the discharges be coughed into the face or upon the clothing of the attendant.

The hands of the attendant should always be disinfected by washing in the carbolic solution and in

soapsuds after making applications and before eating.

Surfaces of any kind soiled by discharges should be immediately flooded with carbolic solution.

All utensils used by the patient must be kept for his use alone and not removed from the room, but must be washed in the carbolic solution and in hot soapsuds. After use the soapsuds should be thrown in the water-closet and the vessel which contained it washed in the carbolic solution.

The sick-room should be thoroughly aired two or three times a day and swept frequently after scattering wet sawdust or tea leaves on the floor to prevent the dust from rising. After sweeping, the room should be dusted with damp cloths. The sweepings should be burned and the cloths soaked in the carbolic solution.

When the disease is recognized shortly after the beginning of the illness all hangings and unnecessary furniture should be removed from the sick-room.

After recovery, the patient's body and hair should be washed with hot soapsuds, he should be dressed in clean clothes, which have not been in the room during the illness, and taken from the apartment.

The quarantine should last as long as the diphtheria bacilli are found upon the mucous membranes; they may persist for six or eight weeks.

The nurse and physician should wear, while in the sick-room, a gown which covers the clothing com-

pletely. This should be kept just outside the apartment and sterilized directly after use. If the patient, while the throat is being examined, should cough in the examiner's face, the latter should wash the face and hair in soap and water followed by 1 to 1,000 mercury bichlorid solution. The hands must always be sterilized upon leaving the sick-room. The nurse should spray or gargle her throat several times a day with a mild antiseptic, such as Dobell's solution.

It is strongly advisable that the nurse and members of the family, if they have been exposed, should receive an immunizing dose (100 to 500 units) of anti-toxin and at the first sign of sore-throat a full dose must be given. The effect of an immunizing dose lasts about four weeks and at the close of this period a second dose should be given if there is continued exposure.

After removal of the patient the room and its contents should be disinfected and aired in the manner described in Chapter IV.

Treatment.—The patient should be kept in bed during the acuity of the disease; even in hospitals a separate room for each patient is to be preferred. Cases complicated by pneumonia should be isolated under all circumstances. The apartment should be kept cool and freely ventilated.

The treatment of diphtheria by antitoxin is attended with such good results that it is rapidly displacing all

forms of drug treatment. The antitoxin is a yellowish transparent fluid and should be administered subcutaneously by means of an ordinary hypodermatic syringe which has been properly sterilized. The skin of the site selected for the injection, usually the thigh, the abdomen or the side of the chest, should be bathed with soap and water, washed off with 1 to 5,000 mercury bichlorid solution and the needle puncture should be covered with a bit of sterile gauze held in place by adhesive plaster. The quantity administered depends upon the age of the patient and the severity of the infection. The initial dose of antitoxin should usually be from 1,000 to 2,000 units—a unit being the quantity of antitoxin required to neutralize the amount of diphtheria poison necessary to kill one hundred small guinea-pigs.

After the injection there is likely to be a slight local reaction—pain, tenderness, redness or edema. Various skin eruptions may follow the administration of antitoxin and these are sometimes accompanied by constitutional symptoms. Most commonly the rash appears upon the buttocks, abdomen or chest; there may be itching and occasionally there is desquamation.

The drugs which seem to influence the disease most are mercury bichlorid and the tincture of iron chlorid; they, especially the former, must be carefully given. The bowels should be kept open by suppositories or

enemata; for the heart weakness whiskey and other cardiac stimulants may be necessary.

Local Treatment is an important adjunct to anti-toxin, and should be employed even if the patient objects. Older children and adults may use sprays and gargles, but for young children irrigation is necessary. In employing this measure the child should be tightly wrapped in a sheet to prevent struggling and the irrigation tube passed into the mouth—in which case the teeth should be kept separated by means of a cork—or the nose, allowing the fluid to return through the nose or the mouth as the case may be. The child should be laid upon a table, with its head low and the mouth directed toward the table edge so that the fluid may run out and flow over a rubber sheet adjusted for the purpose, into a pail upon the floor. The irrigation should be of some mild antiseptic solution given lukewarm through a soft catheter attached to a fountain syringe. If the nose is entirely occluded a passage for the catheter must be made along the floor of the nostril by means of a probe with a swab of cotton upon its end.

Irrigation does not reach the membranes in the larynx and when the disease attacks this situation a tent should be made over the child by means of a blanket and the tube of a croup kettle inserted through an aperture. The inhalation of hot steam exerts a very beneficial action upon the inflammation; a little tur-

pentine or creosote added to the water in the kettle may increase the good effect. A marked laryngeal obstruction may be dislodged by a mild emetic, but this should never be employed in weak patients; under such circumstances the inhalation of calomel vapor may be substituted. This process is accomplished by closing the tent as tightly as possible and directing into it the vapor of ten to thirty grains of calomel burned upon a tin plate over a spirit lamp.

If there is danger of suffocation from laryngeal obstruction either *intubation* or *tracheotomy* must be performed. The former consists in inserting a specially constructed tube into the larynx by means of an instrument adapted to the purpose. Attached to the tube is a cord to prevent its being lost in the esophagus or trachea. The intubation tube may be worn continuously for several days or extracted at intervals to be cleansed; in some cases it may be necessary to remove it at feeding time; other patients learn to eat with it in place. While wearing the tube the patient should be kept in an atmosphere of steam and must be continuously watched lest the tube become plugged.

Tracheotomy may be necessary if the obstruction extends to the trachea. The operation consists in making an opening into the trachea with a scalpel and inserting a specially constructed tube.

The treatment of the complications is that usually

employed in those conditions when they occur ordinarily.

The Diet should be chiefly of milk and given in sufficient quantity—three quarts a day being none too much for an adult. There is much more danger of under- than of over-feeding. Intubated cases may swallow semisolids more easily than liquids and in such cases these may be allowed. In cases where swallowing causes coughing and in intubated cases feeding by gavage through the mouth or nose may be necessary. Frequently, especially in intubated patients, feeding is best accomplished while the patient lies upon his back with his head well down.

With regard to points other than those mentioned above the nursing should be conducted according to the ordinary rules.

FALSE DIPHTHERIA.

Synonyms.—Pseudo-diphtheria; membranous croup.

This is a disease which resembles in appearance and symptoms true diphtheria but differs from it in causation. It may complicate the infectious diseases or occur by itself; the membrane does not show the presence of the Klebs-Loeffler bacillus but contains the ordinary pus germs (streptococci and staphylococci). Bacteriological examination is always necessary to differentiate the two diseases. False diphtheria is usually milder, shorter and less likely to be followed by complications.

The treatment, diet and nursing are the same as those applicable to true diphtheria, except that the administration of antitoxin is useless. Also, less strict quarantine and disinfection are required, although the possibility of transmitting the disease from one patient to another is not out of the question.

ACUTE ARTICULAR RHEUMATISM.

Synonyms.—Inflammatory rheumatism; rheumatic fever.

Definition.—An acute febrile disease, probably infectious, and characterized by inflammation of the joints.

Causation.—A tendency to the disease may be inherited. It occurs chiefly in young adults and is more common in males than in females. It is predisposed to by exposure to cold and wet, by unhygienic environment and mode of life. The specific germ of rheumatism has not yet been isolated but it is probable that the disease is of infectious origin.

Course and Symptoms.—The onset of the disease is usually sudden. The temperature rises rapidly and one or more of the joints becomes swollen, painful, reddened, hot and tender. The tongue is coated and the pharynx or tonsils may be inflamed. The joints involved most frequently are the knees, the wrists, the ankles and those of the fingers. It is unusual for the inflammation to be confined to a single joint, and fre-

quently the process travels from one joint to another, one improving as another becomes affected. Sweating is a prominent feature of the disease. The reaction of the perspiration as well as that of the saliva is acid. The temperature ranges from 100° to 104° F. (37.8° to 40° C.). The symptoms, unless the disease is treated, continue from one to three weeks—then gradually ameliorate. Relapses are frequent. When the inflammation travels from one joint to another the temperature rises and the symptoms recur as fresh involvement takes place.

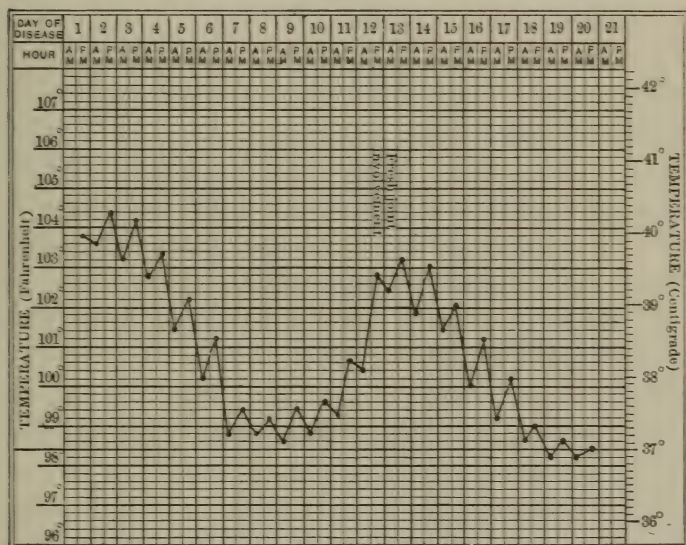
Complications.—Hyperpyrexia is a grave complication and usually results in death. The temperature may rise as high as 110° or 112° F. (43.3° or 44.4° C.). Various eruptions are occasionally seen, and especially in children nodules (*erythema nodosum*) may appear over the tendons upon the back of fingers, hands or wrists. Tonsillitis frequently occurs with rheumatism and certain authorities believe that it results from the same cause. Inflammations of the heart and pericardium are very common, especially in young patients.

Chorea is also very frequently seen.

Prevention.—Persons predisposed to the disease should avoid exposing themselves to cold and wet and during the cold months should wear woollen underclothes. They should take moderate exercise and en-

deavor to keep the function of digestion in proper condition.

Treatment.—While the inflammation remains acute the patient should be kept in bed and warmly covered. When it becomes necessary to change his position he should be lifted, consequently a muscular



CLINICAL CHART OF ACUTE ARTICULAR RHEUMATISM showing renewal of the febrile movement consequent upon fresh joint involvement.

nurse is an essential. The bowels should be kept open by saline laxatives. The drug which exercises the most beneficial influence over the disease is the sodium salicylate given in large doses and in connection with the alkalis. Such medication should be given only upon a physician's prescription.

The fever may be controlled by sponge baths; for the hyperpyrexia cold packs or tubs are required. Local applications of equal parts of guaiacol and glycerin, of oil of wintergreen, or of glycerin and the fluid extract of belladonna will do much to relieve the pain in the joints. Further comfort may be obtained by wrapping the joints in cotton, by the application of padded splints, sand bags and small pillows adjusted about the inflamed limbs. The joints should always be placed in mid-flexion. Very severe pain may be mitigated by the application of blisters. During convalescence the patient should remain quiet and should avoid draughts. Too early return to meat diet is to be strongly advised against.

Pericarditis or endocarditis may be controlled by the application of cold over the heart and by sedative drugs.

The Diet during the febrile stage should be entirely of fluids. During convalescence a gradual return to a solid diet is permissible. The addition of meat to the diet should be postponed so long as is possible.

Alcoholic drinks and sweats also should be avoided.

The nursing is to be carried on in accordance with the usual rules.

ERYSIPELAS.

Synonym.—St. Anthony's fire.

Definition.—An acute, febrile, contagious disease, characterized by a chill, intense local redness of the

skin and mucous membrane involved, a remittent fever and tendency to recur.

Causation.—The disease is met most frequently in the spring and autumn and amid unhygienic surroundings. It attacks most commonly individuals addicted to alcohol and others who are constitutionally weakened. It has been known to become endemic. Its specific cause is a germ known as the *streptococcus erysipelatus*, which enters the body through some abrasion of the skin or mucous membranes. The abrasion may be so small as to escape notice.

Varieties.—There are various forms of this disease but the more important are the following.

(1) *Cutaneous Erysipelas.*—The onset is sudden with a chill, fever and spots of redness on the skin. The fever is high, remittent and terminates on the fourth or fifth day, usually by crisis. In young persons the symptoms are, as a rule, slight, but erysipelas in infants, which is likely to follow infection of the umbilical cord, is generally fatal; in old persons the nervous symptoms may be marked and death usually results.

The red spots tend to coalesce and to become slightly elevated. The margins of the infected area are sharply defined, red and swollen. As the disease progresses the area spreads, the color at the original site fading as fresh areas are involved (*wandering erysipelas*). The redness disappears on pressure, to re-

turn as soon as the pressure is removed. There is slight burning pain. Vesicles which may become pustules appear on the involved part. The eruption may vary in shade; in vigorous persons it is usually bright or dark red, dusky when pus is about to form and blue when gangrene is about to appear or when there is involvement of the heart or lungs. When the inflammation ceases, the swelling and redness disappear and desquamation follows.

(2) *Phlegmonous Erysipelas*.—The onset is marked by chills, sweats, high temperature— 104° to 106° F. (40° to 41.1° C.)—delirium and severe prostration. The swelling is much more pronounced than in the preceding type. It is brawny and may be so intense as to produce sloughing or gangrene. Suppuration generally takes place, extending into the tissues beneath, into the muscles and even into their sheaths and those of the tendons. As the disease progresses, sloughs form and fall, leaving ulcers; in some cases the muscles, tendons, etc., may be eaten away. This type of the disease sometimes follows extravasation of urine.

(3) *Cellulitis* is that form of erysipelas in which the microbe has effected entrance through a wound. The swelling, which is not so marked as in the phlegmonous variety, appears before the redness, which latter symptom is not so pronounced as in the cutaneous form. The inflammation appears at the edges of the wound

and does not leave the original focus as the disease extends. The poison, in mild cases, is disposed of by the lymphatic system, but severe cases are marked by suppuration in the wound and the adjacent lymph glands.

Complications such as septicemia, pyemia, pneumonia, meningitis and arthritis may arise.

Treatment.—The first step in all forms of the disease is to isolate the patient; he should be kept in bed and the wound if evident should be thoroughly cleansed with antiseptics; the bowels should be kept freely open. In vigorous persons facial erysipelas requires but little treatment, but in weak and debilitated individuals free stimulation is necessary. High temperature may be controlled by cold bathing. An injection of a two per cent. solution of carbolic acid into the healthy skin just beyond the inflamed area or a band of iodine painted upon the skin may arrest the advance of the disease; scarification is sometimes practiced. Lead and opium wash, a ten per cent. solution of ichthyol in water, or an ichthyol ointment will relieve the burning pain. In the phlegmonous variety the sloughs should be cut and hot or cold fomentations applied. Continuous irrigation of the sloughing surface with an antiseptic solution may be employed. In the form characterized by cellulitis disinfection and free drainage of the wound by incision are necessary. The

constitutional treatment of all forms of the infection is supportive and stimulative.

Injections of antistreptococcus serum have been employed in the disease with varying results.

The Diet during the febrile stage should be of fluids and easily digested semisolids. After the temperature has become normal easily digestible solids may be allowed.

The nurse should pay the utmost attention to the condition of her hands and face. She should carefully seal all abrasions of the skin with sterile colloidion and should thoroughly sterilize her hands after contact with the patient. Before attending another patient she should bathe and wash her hair with mercury bichlorid solution and all clothing worn while in association with the patient should be properly disinfected. Aside from these points the general principles of fever nursing are applicable in erysipelas.

SEPTICEMIA.

Synonym.—Blood poisoning.

Definition.—A disease due to the existence in the blood of any of the pus-forming germs and characterized by recurring chills and irregular febrile movement.

Causation.—Pus germs may effect entrance to the body through any abrasion in the skin or mucous membranes. The site of their entrance may be so minute as to be impossible of discovery, or it may be a

wound of any size or character. The germs having entered the system, either themselves, or the products of their growth (toxins) or both these elements give rise to the symptoms.

Course and Symptoms.—Within a few hours after infection has taken place the patient suffers from chilly feelings, or a distinct chill, followed by a rise of temperature. He becomes restless, his skin is hot and dry and there may be headache, general pains, nausea and vomiting. The pulse is rapid and the respiration may be accelerated. These symptoms may last but a few days in mild cases and then disappear. In severe septicemia the symptoms are greatly intensified and those referable to the nervous system are very marked. The chill at onset is severe and at intervals other chills occur. The temperature rises rapidly and may reach 104° to 106° F. (40° to 41.1° C.). In some cases the temperature may fall below normal. The prostration is great; the pulse is feeble and rapid. As the disease progresses the symptoms become those of the typhoid state. The tongue becomes brown and dry; the skin is wet with cold perspiration. There may be diarrhea. The urine is high-colored and is likely to contain albumin and casts. The wound which is the source of infection may become dry, gangrenous and fetid.

In progressive septicemia, the symptoms begin less acutely and progress less rapidly, otherwise they re-

semble those just described. The fever may persist for a number of weeks; frequent chills and sweats accompany it and various skin eruptions are likely to appear. This variety of the disease may be fatal within a few weeks, or last for a long time, eventually ending in recovery.

Prevention.—This consists in the careful attention to hang nails and other abrasions when they exist. When a nurse is employed upon a septic case such abrasions should be covered with collodium or, if necessary, she should wear rubber gloves. Any wound received while in contact with such a patient must be immediately cauterized with pure carbolic acid which should be quickly washed off with alcohol. In the absence of this agent, the wound should be sucked to induce free bleeding and dressed antiseptically.

Treatment consists in keeping all wounds as clean and free from septic material as possible and in certain cases entire excision of the infected focus. The bowels should be kept open by salines; the fever should be combated by cold sponges. Stimulation by means of alcohol is frequently necessary.

The chronic form of the disease, when it is impossible to remove the source of the infection, should be treated by supportive measures and tonics.

The Diet should consist of easily digested foods in plenteous quantity and should be administered with frequency and regularity.

PUERPERAL FEVER.

Synonyms.—Puerperal septicemia; puerperal infection; child-bed fever.

This disease is merely a variety of septicemia in which the point of entrance of the infection is the uterine mucous membrane. The chief cause is the incomplete removal of placental tissue after childbirth. The constitutional symptoms are the same as those described under septicemia, and in addition, the discharge from the vagina may be profuse and very foul.

With proper care the disease should be almost entirely preventable.

During pregnancy the attending physician should treat all inflammations of the vulva, urethra, bladder, vagina and uterine cervix so that at the time of delivery there shall be no source from which infection may enter the uterus. As the time of labor draws near, the patient should be told not to touch her genitals. The physician should make as few vaginal examinations as possible and these only after thorough cleansing of the parts, and sterilization of his hands. The nurse should make none at all. In preparing the patient for vaginal examination the nurse should first cleanse her hands by thorough scrubbing with a brush, soap and hot water; she should then cleanse the patient's external genitals by means of a cotton wiper wet in 1 to 3,000 mercury bichlorid, and place her in the posi-

tion preferred by the physician. If instruments be used these must first have been boiled.

During labor the strictest asepsis with regard to hands, instruments and dressings must be maintained.

If the delivery be instrumental or if manual removal of the placenta or its membranes becomes necessary, it is usual to follow these procedures by an intra-uterine douche of 1 to 5,000 mercury bichlorid solution given from a fountain syringe which has previously been washed with hot 5 per cent. carbolic acid solution, and through a glass douche nozzle which has been boiled.

During the puerperium all dressings applied must be strictly sterile and manipulated with sterilized instruments and hands. Should catheterization become necessary it should be performed in the usual manner (see p. 59).

Treatment.—The general treatment of puerperal sepsis is identical with that of septicemia from other causes. The special treatment consists in attempting to maintain cleanliness in the vagina and uterine cavity. This may be done by irrigations of 1 to 10,000 mercury bichlorid or one per cent. lysol solution, and by packing these cavities loosely with ten per cent. iodoform or sterile gauze.

When the infection is due to retained fragments of placenta or membranes these should be removed by

blunt curettage followed by a douche of the composition described above.

PYEMIA.

Definition.—A febrile disease due to infection by pus-forming germs which are carried by the blood from one part of the body to another, and at their points of lodgment set up local infectious processes.

Causation.—The cause of pyemia has already been dealt with in the section devoted to the causation of septicemia (p. 170). The pus-forming germs having effected entrance to the blood stream, by this means are transferred to various parts of the body and cause abscesses wherever they may lodge.

Course and Symptoms.—The symptoms of septicemia usually precede those of this disease. The onset of pyemia is marked by an intense chill, followed by a rapid rise of temperature, general pains, vomiting and great prostration. The pulse is rapid and weak. Chills frequently recur and the temperature curve is marked by frequent quick falls and rises. The temperature often drops to normal or below, and suddenly rises to several degrees above the normal level. There are frequent sweats. The patient loses flesh rapidly, the tongue is dry and the breath may have a sweetish smell. There may be diarrhea with foul-smelling stools. Sometimes the skin is slightly jaundiced and various eruptions may appear. The urine is high-colored, scanty, and may contain albumin and casts.

Late in the disease delirium and stupor are frequent. The patient grows rapidly weaker and there is a marked tendency to the formation of bed-sores. As the infectious process is set up in the various organs certain symptoms occur as follows:

(a) If in the lung, pain in the chest, shortness of breath, and cough with blood-stained expectoration.

(b) If in the liver or spleen, pain and tenderness referred to these organs. As the process goes on to abscess formation, local swelling is likely to take place.

(c) If in the heart, the pulse becomes more rapid, the temperature higher and the respiration accelerated.

(d) In the kidney there may be pain and there is usually bloody and albuminous urine.

Prevention.—The prevention of this disease is identical with that applicable to septicemia.

Treatment.—The treatment resolves itself into opening and draining of the abscesses when their situation permits. Otherwise pyemia should be managed in accordance with the methods already laid down for septicemia.

The nursing of septicemia, puerperal fever and pyemia aside from the points mentioned under these diseases should be conducted along the same lines as those proper in general fever nursing.

MUMPS.

Synonym.—Epidemic parotitis.

Definition.—An acute, infectious disease characterized by inflammation of one or both parotid glands, extending occasionally to the submaxillary glands, and rarely to the testicles, ovaries and mammary glands, and accompanied by mild constitutional symptoms.

Causation.—The disease is most commonly seen in childhood and youth, and usually occurs in the winter and spring. It is more common in males than in females. By no means all the children exposed contract the disease. Mumps spreads by contact in most cases but it has been known to be communicated through a third person and by clothing. Its specific cause is not known, and one attack usually confers protection.

Course and Symptoms.—The incubation period is usually about two weeks but may extend to twenty-one days. The onset of the disease is marked by chills, followed by a rise in temperature to 101° to 103° F. (38.4° to 39.5° C.), headache, general pains and prostration. In about twenty-four hours one or both parotid glands become swollen and tender, the skin over them becomes tense and there may be pain on swallowing and sore-throat. An elevation of the lobe of the ear is a characteristic sign of parotid swelling. The glands may be affected simultaneously or successively; in the latter case the disease is prolonged. The inflammation reaches its height in from three to six days, remains stationary for a day or two and then declines.

As the swelling goes down the constitutional symptoms ameliorate. Extension of the inflammation to the other salivary glands, testicles, ovaries and mam-mæ protract the course of the infection.

Complications other than those mentioned above and relapses are infrequent.

Prevention.—The patient and nurse should be isolated for at least ten days after the swelling has disappeared, but the disease is of such mild type that the more complicated methods of disinfection are unnecessary.

Treatment.—Rest in bed should be enjoined; very little drug treatment is needed; the symptoms may be controlled as they arise. Hot or cold compresses should be applied to the affected glands, the bowels should be moved daily and if the testicles are involved they should be allowed to rest upon a shelf constructed of a strip of adhesive plaster placed across the thighs just below the groins.

The Diet during the height of the disease should be entirely of fluids; the nursing may be carried on according to usual methods.

BUBONIC PLAGUE.

Synonyms.—Malignant adenitis; the pest.

Definition.—An epidemic, contagious, febrile disease, characterized by swelling and inflammation of the lymph glands and hemorrhages from the mucous mem-

branes. It is common in India and Eastern Asia, whence it may be imported into Western countries.

Causation.—It is most common in the hot months and is seldom seen in individuals beyond middle life.

The specific cause of the disease is the *bacillus pestis*. This organism enters the body through the respiratory or alimentary tracts or abrasions of the skin and is found in the blood of patients and in the pus from the suppurating glands. It is given off in the feces, urine and sputum, and contaminates clothes, bedding, apartments and the like. It may be carried by fleas and other insects, by rats, mice, dogs, etc.

Filthy and unhygienic surroundings predispose to the occurrence of epidemics.

Course and Symptoms.—The incubation period lasts from two to seven days, during which time the patient may feel indefinitely ill.

The onset proper is fairly sudden with chilly feelings followed by high fever— 105° to 106° F. (40.5° to 41.1° C.)—rapid pulse, and respiration. The headache and general pains are very distressing, and there are all the symptoms of severe infectious disease.

Vomiting of blood is fairly frequent.

The mental symptoms are marked and delirium may appear early.

Within a few days the glands of the neck, axillæ and groins become painful, red, tender and swollen. The buboes thus formed may be gradually absorbed

or rupture, leaving sinuses discharging pus. Rupture is a favorable sign. Carbuncles and hemorrhages into the skin are common in some epidemics.

The fever lasts about a week and then gradually falls, the other symptoms ameliorating. The disease, however, is attended by large mortality.

In certain cases the fever is prolonged for a number of weeks as a result of septicemic poisoning, and in others death from the severe toxemia occurs within a few hours.

The Pneumonic Type is characterized by respiratory symptoms and bloody sputum which contains the bacillus.

Prevention.—Quarantine and the strictest isolation are absolutely necessary, and should be continued for a month after recovery. The measures necessary for disinfection of excreta, clothing, apartments, etc., are the same as those described in the section relating to smallpox (p. 211).

Fortunately physicians and nurses who exercise proper care seldom contract the disease.

Preventive inoculations by various serums have resulted in a very considerable diminution in the death rate and the measure is one not to be neglected.

Treatment.—The usual symptomatic treatment of febrile disease is indicated; cold wet applications should be made to the buboes until the presence of

pus is evident and then incision and drainage are necessary.

Further research may prove that intravenous injections of anti-plague serums are of benefit.

The nursing is the same as that applicable to other actively contagious diseases.

CHAPTER VII.

INFECTIONS OF INTERMITTENT TYPE.

Malarial Fever: Relapsing Fever: Dengue.

MALARIAL FEVER.

Synonyms.—Chills and fever; fever and ague; paludism; paludal fever; swamp fever.

Definition.—An infectious disease characterized by paroxysms recurring regularly at various intervals and consisting of a chill followed by fever and sweating.

Varieties.—*Tertian (single)*, in which the paroxysms occur every forty-eight hours.

Quotidian (double tertian), in which the paroxysms occur every twenty-four hours.

Quartan, in which the paroxysms occur every seventy-two hours.

Estivo-autumnal, in which the paroxysms occur at irregular intervals.

Pernicious, a remittent malarial fever early in which the paroxysms may occur regularly while later in the disease the temperature does not fall to normal in the interval and may continue high.

Chronic Malaria (Malarial cachexia) is caused by the continuance of any of the above varieties; there

may be no febrile movement but the disease is characterized by marked constitutional weakness.

Causation.—Malaria is less common in the very young and in aged persons than in young and middle-aged adults; negroes are less susceptible to the disease than whites. Malaria is most common in damp and swampy places and the greatest number of cases is observed in late summer and early autumn.

The specific cause of the disease is a parasite, the *plasmodium malariae*, which circulates in the blood, and which in reproducing itself causes the paroxysms. There are three types of the organism, each causing a different form of malaria. These differ somewhat in appearance, but the important difference is that their life-cycles are of different durations. The tertian form reproduces itself every forty-eight hours, the quartan form every seventy-two hours, and the estivo-autumnal form at irregular intervals. The quotidian, or daily type, is due to two sets of the tertian organism reproducing themselves upon alternate days so that a paroxysm occurs each day.

It is believed that these forms are merely different types of the same organism acting in different ways.

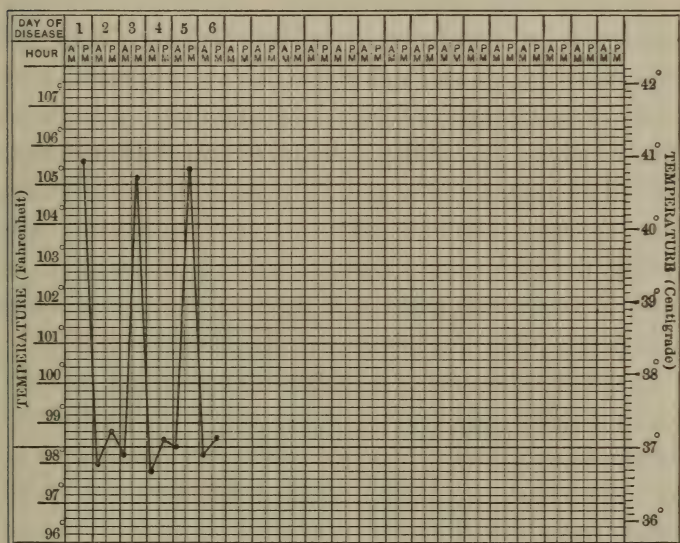
It has been conclusively demonstrated that the disease may be transmitted from one individual to another by the bites of certain kinds of mosquitoes and some observers assert that this is the only means of transmission.

Course and Symptoms.—The incubation period is variable, but is usually from ten to twelve days. The disease caused by the tertian organism is most common in the United States and the estivo-autumnal form is the most serious of the three main types.

A malarial paroxysm consists of a short period of invasion during which there may be headache, nausea and apathy. Then appears the chill which lasts from one half to two hours; this usually manifests itself late in the morning and almost never at night. In children it may be replaced by a convulsion. During the chill the patient shivers, complains of great cold which even hot-water bottles and numerous blankets may not counteract. There is severe frontal headache and perhaps nausea and vomiting. The pulse is rapid and tense. At the end of one or two hours the *febrile stage* commences; the temperature rises very rapidly to 104° or 106° F. (40° to 41.1° C.). The skin is hot and dry, there is great thirst, there are severe headache and pains in the back and limbs. The pulse is full and rapid. There may even be brief delirium. The fever lasts from two to twelve hours, then falls rapidly to normal or perhaps to a degree or two below and the stage of *sweating* begins. All the symptoms subside and there is profuse perspiration. The patient may now go to sleep and wake later feeling perfectly well. The next paroxysm occurs one, two, or three days later and may begin an hour or two earlier

or later than its predecessor; in such event it is spoken of as anticipated or delayed as the case may be.

During malaria fever sores on the nostrils or lips are common; if the paroxysms are repeated for a



CLINICAL CHART OF ORDINARY OR TERTIAN MALARIA showing three febrile paroxysms occurring on alternate days.

considerable time the spleen becomes enlarged and the patient becomes anemic.

In the estivo-autumnal type the paroxysms last from sixteen to twenty hours and the fever tends to become remittent—from 100° to 104° F. (37.8° to 40° C.)—the beginning chill is milder and gastro-intestinal symptoms—vomiting, abdominal distention, diarrhea—are

frequently prominent; the headache, restlessness and sleeplessness are marked; there may be delirium followed by stupor or coma; the pulse is rapid and frequently weak. This type of the disease may last from ten days to a month or merge into

Pernicious Malarial Fever.—This variety is rare in the United States and occurs in three important forms.

(a) *The Comatose Type*, in which there are symptoms of severe cerebral disturbance—delirium or coma. The onset may or may not be marked by a chill; the fever is high— 106° to 107° F. (41.1° to 41.7° C.)—during the paroxysm; there is profuse sweating; the pulse is weak and rapid and there is extreme general weakness. This variety is usually fatal.

(b) *The Hemorrhagic Type.*—There may or may not be a febrile paroxysm; the skin is jaundiced; hemorrhages occur from the various mucous membranes or into the skin; the urine is diminished and is dark either from the presence of blood-pigment or blood itself (hemoglobinuric or black-water fever). There is restlessness or perhaps delirium. The patient may die or the paroxysm may subside, but usually only to recur.

(c) *The Algid or Congestive Type (Congestive Chill).*—This is characterized by severe gastric and intestinal symptoms—the diarrhea in particular may be very marked—indefinite chilly sensations with clammy skin, blueness and great prostration are frequent. The

temperature usually is not high and may be sub-normal, jaundice is common and the condition is a very serious one.

Malarial Cachexia or *Chronic Malaria*, is a consequence of continued attacks of the ordinary forms of the disease and is characterized by extreme weakness, yellowness of the skin and profound anemia. Enlargement of the spleen is usual in this as in other forms of protracted malaria. Shortness of breath and swelling of the feet and ankles are common, and bleeding from various parts of the body may occur. The temperature may continue low or may show irregular elevations to 102° to 103° F. (38.9° to 39.5° C.).

Prevention.—The extermination of mosquitoes and the draining of swampy lands go far toward lessening the frequency of the occurrence of this disease.

Treatment.—During the chill the patient should be kept warm by means of blankets and hot-water bottles. The headache may be relieved by hot or cold applications. Sponging with cold water may be practiced during the febrile stage and the thirst may be mitigated by frequent drinks of cold water or lemonade. During the stage of sweating the nurse may make the patient more comfortable by wiping his skin with warm flannel.

Quinin should be given by mouth in the ordinary types of the disease but not during the height of the fever when it may be vomited; in the pernicious types

it should be given hypodermatically and in connection with arsenic.

Malarial cachexia responds best to quinin, in the form of Warburg's tincture, and arsenic, with iron and various other tonics to build up the system as adjuvants. Massage, especially over the splenic region, is useful.

The diet during the febrile movement should be of fluids only, but in the intervals between the paroxysms simple solid diet may be allowed.

With regard to points other than those given above for the nursing of malaria, the attendant may conduct the case in accordance with the general principles of fever nursing.

RELAPSING FEVER.

Synonyms.—Famine fever; recurrent typhus; spirillum fever; seven day fever.

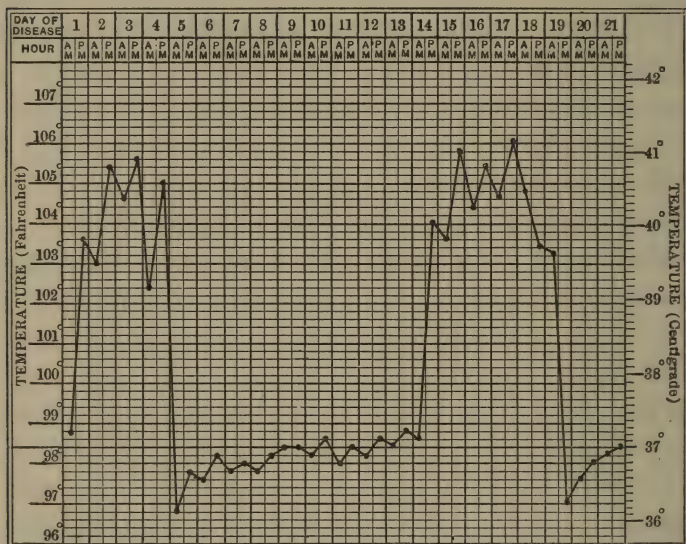
Definition.—An acute, epidemic infection characterized by a febrile movement lasting about six or seven days followed by an afebrile interval of about a week, after which the febrile paroxysm recurs and may be repeated three or four times.

Causation.—The most favorable conditions for the development of the disease are those of famine and filth. The specific cause is a spiral-shaped bacterium which circulates in the blood, but is not found in the stools and other excreta. It is found in the blood only during the febrile stage. The infection is transmitted

by clothing, bed-linen, etc., by personal contact or through a third person. Physicians merely visiting cases for short periods are less liable to infection than nurses. How the organism effects entrance to the body is unknown; possibly it is taken in upon the inspired air or through the skin. The disease occurs in both sexes and in all ages, but is rare in the United States. One attack does not protect against subsequent infections.

Course and Symptoms.—The incubation period is usually from five to seven days, although it may be much shorter. The onset is sudden with a chill followed by fever, severe headache and pains in the back and limbs. Sweating is common. The temperature rises rapidly and may reach 104° F. (40° C.) upon the first day. The pulse is rapid (110 to 130). There may be severe nausea and vomiting and marked cerebral symptoms. Intestinal derangement is rare; jaundice is not infrequent. The spleen is enlarged and, rarely, may rupture. There is no typical eruption but there may be a reddish mottling of the skin or petechial spots. The fever after lasting for about seven days falls by crisis in a few hours to normal or below. Accompanying the fall in temperature there is usually sweating and sometimes diarrhea. The patient rapidly regains strength but usually in a week the attack is repeated. The relapse is, as a rule, shorter than the first paroxysm and several (three to five) of these may

occur. In protracted cases convalescence is slow for the patient is likely to be much weakened. The disease is not a very fatal one and death, when it takes place, is usually due to complications.



CLINICAL CHART OF RELAPSING FEVER showing the febrile movement upon the fourteenth day.

Complications.—Pneumonia is common; gastric or intestinal hemorrhages are more rare.

Prevention.—On the appearance of an epidemic measures should be taken to provide food for the suffering poor and to improve the sanitary condition of their surroundings in every way, especially by attention to the proper disposal of garbage. Although there is

no proof that the disease is transmitted by drinking water it is wise to boil all water used for this purpose. Relapsing fever does not spread readily under conditions of cleanliness and where ventilation is thorough, consequently plenty of fresh air should have access to the sick-room and when the disease has run its course the apartment as well as the clothing, bedding and utensils must undergo proper disinfection.

Treatment.—The patient should be isolated and kept under strict quarantine. There is no drug which influences the disease, consequently the symptoms must be treated as they arise, according to general principles. The temperature may be controlled to some extent and the patient be made more comfortable by cold sponging. The diet should be fluid but in the afebrile intervals semi-solids may be allowed. When there is extreme prostration, heavy stimulation may be necessary.

The nursing should be conducted according to the methods usual in febrile diseases.

DENGUE.

Synonyms.—Breakbone fever; dandy fever.

Definition.—Dengue is an acute, infectious febrile disease occurring in warm countries, characterized by pains in the muscles and joints and an erythematous skin eruption.

Causation.—It occurs chiefly in hot climates and at the warmer and more moist seasons of the year. It

is common in the East and West Indies, but is seldom seen in the United States, except along the coast of the Gulf of Mexico. It is believed to be caused by a microörganism which circulates in the blood and is transmitted through the bites of mosquitoes in the same manner as the infection of yellow fever. The infection is probably not transmitted by contact with patients nor through clothing, etc. The disease is seldom fatal.

Course and Symptoms.—The incubation period is from two to five days. The onset is marked by an acute chill, or in the case of children by a convulsion. A rise of temperature follows to 104° to 106° F. (40° to 41.1° C.). The pulse is rapid and there are nausea, vomiting, and severe headache accompanied by pain and tenderness in the muscles of the trunk and limbs. The joints are hot, painful, red, tender and sometimes swollen. The pains in the joints and muscles, causing a stiff gait, have given rise to the name "dandy fever." The glands of the neck, axillæ and groin may be swollen. There are flushing of the face, suffusion of the eyes, a coated tongue, highly colored and scanty urine and weakness and prostration. The eruption is a reddish blush which may itch and usually disappears on the third or fourth day; it is sometimes followed by desquamation.

The rise in temperature lasts from three to five days and then falls by crisis accompanied by sweating and amelioration of all the symptoms. The temperature

remains normal for several days and then the symptoms of the onset of the disease return, but with less severity ; during this recurrence various forms of skin eruptions may appear. The recurrence lasts from two to three days and a second crisis ensues after which convalescence is established.

The patient recovers strength slowly and is likely to be troubled by a persistence of the joint pains.

Relapses are not infrequent but complications are rare.

Prevention of the disease consists in destroying the mosquitoes, preventing their access to patients ill with the infection and protecting the healthy from their bites. Quarantine and disinfection in the light of our recently acquired knowledge of the mode of transmission of the contagium are unnecessary.

Treatment.—The patient should be kept in bed while the symptoms are acute ; the medicinal treatment is wholly symptomatic. The pains may be relieved by the administration of various analgesic drugs and the joint inflammation lessened by applications of cold or heat.

The Diet during the febrile stages should be of fluids alone ; during convalescence strength-giving foods should be given in easily digestible forms.

The nursing should be carried on in accordance with general principles.

CHAPTER VIII.

THE EXANTHEMATA.

Scarlet Fever: Smallpox: Chickenpox: Measles: German Measles: The Fourth Disease of Dukes: Epidemic Cerebrospinal Meningitis.

These diseases are known as the *infectious exanthemata* (from a Greek word meaning an eruption) and are characterized each by a typical rash upon the skin. They are all contagious and, except smallpox, are most frequently seen in children.

SCARLET FEVER.

Synonym.—Scarlatina.

Definition.—An acute, infectious fever characterized by a scarlet rash upon the skin and usually accompanied by sore-throat.

Causation.—The disease is endemic and at times appears in epidemics of varying intensity. The majority of cases occur in children under ten years of age. Nursing infants however seldom contract the disease; in pregnancy and after surgical operations susceptibility is increased. Certain individuals, some families and certain races, for instance the Japanese, seem unable to acquire the infection. Scarlet fever is due to a specific

organism which it is believed has been recently discovered.

The infection is spread chiefly by the flakes of skin cast off by the patient and perhaps also by the means of his exhalations. The contagium clings persistently to clothing, books, toys and the like and is capable of transmitting the disease for months and even years. The physician or nurse may carry the infection to a third person. Epidemics are most frequent in the fall and winter. One attack usually protects against subsequent infections. It should be remembered that scarlatina is not a light form of scarlet fever, but that the two terms have exactly the same meaning.

The eruption appears from twelve to thirty-six hours after the onset of the disease in the form of tiny red points; these may be so numerous and close together as to give the appearance of diffuse redness; they may occur in irregular patches or they may be widely scattered.

The rash appears first on the neck and shoulders and extends to the body, arms and legs. In one to four days it reaches its maximum and the skin becomes almost uniformly red and swollen. Drawing the finger nail over the skin leaves a whitish line which quickly disappears. The eruption is most marked upon the parts of the body which are kept warm. Upon the face the eruption is much less marked and usually appears only on the forehead and cheeks, the skin about

the nose and mouth remaining pale. The eruption remains at its height from one to three days and gradually disappears as the temperature approaches normal. The rash appears also upon the pharynx.

Irregular eruptions are frequent and puzzling; they may appear only upon the trunk, the limbs or the face; they may remain in the stage of diffuse patches; they may last but a few hours; they may be entirely absent.

Course and Symptoms.—The incubation period is usually one week, but may vary from one day to three weeks. Usually during this time there are no symptoms except possibly slight sore-throat. The invasion is sudden with a chill or convulsion followed by a rise of temperature— 104° – 106° F. (40° – 41.1° C.)—rapid pulse, headache, vomiting and sore-throat. In from twelve to thirty-six hours the eruption appears and in about four days the entire skin is red, inflamed and tense; the rash may be present upon the mucous membranes of the mouth and throat causing them to appear vividly red. The tongue is at first coated in the center and red and clean at its edges and tip. Through the coat the red tips of the papillæ may be seen, giving the so-called “strawberry” appearance. In a few days the coat peels off leaving the tongue red and roughened—the “raspberry” tongue. The fever continues, with slight morning remissions, and falls gradually as the rash fades, reaching normal about the seventh day.

Desquamation.—As the fever and rash disappear the skin becomes dry and roughened and its upper layer loosens. This takes place first upon the chest, and gradually the dried flakes fall; the process continues from two to three weeks. Rarely the hair and nails are lost.

Severe Forms of the Disease—*The Anginose Form.*—This is characterized by extreme severity of the throat inflammation. The pharynx and tonsils are swollen and red, and a membrane forms which may extend upward to the posterior nares or forward into the mouth; the lymph glands beneath the jaw and in the neck are swollen and necrosis of the tissues of the throat may follow; with this there is a very foul odor. The inflammation may go on to involve the middle ear and more rarely the trachea and bronchi. The prostration is very marked. If the disease is not rapidly fatal abscesses frequently form in the tissues of the neck. Recovery is rare.

The Hemorrhagic Form.—In this variety hemorrhages may take place into the skin or mucous membranes, and may be evidenced by hemorrhagic spots upon the skin, nose-bleed or bloody urine. In this type death may occur as early as the third day.

The Malignant Form.—In this the invasion is very severe and accompanied by marked cerebral symptoms—delirium or stupor; there may be suppression of urine; the temperature rises rapidly to a very high

point— 108° F. (42.2° C.)—and death is likely to supervene even before the rash is developed.

Complications and Sequelæ.—The most important of these are nephritis and inflammation of the middle ear. *The nephritis* varies in intensity from slight albuminuria and hardly noticeable edema of the feet and ankles to severe kidney inflammation with diminished or even suppressed urine. In the intense cases there are considerable albumin, numerous casts and perhaps blood in the urine, marked dropsy, constant vomiting and uremic convulsions; some of these cases die or go on to permanent chronic nephritis, but prompt and proper treatment may result in the disappearance of the symptoms and the return of the kidneys to a healthy condition.

Ear Complications are frequent and are due to an extension of the throat inflammation through the eustachian tubes. The otitis causes severe pain which persists until the drum membrane ruptures or is punctured, allowing the escape of the pus. The ear inflammation may extend to within the skull and cause various meningeal and brain complications. Deafness is not an uncommon result.

Joint Complications with all the symptoms of acute articular rheumatism may occur. These usually appear after the temperature has fallen to normal, but may show themselves during the febrile movement.

Heart Complications are not rare, and often result in a permanent affection of one or more of the valves of that organ. Inflammations of the pericardium and of the heart muscle may occur as well.

Pleurisy and Pneumonia are infrequently associated with scarlatina.

Chorea sometimes complicates the disease and is most likely to occur in the cases followed by endocarditis and arthritis.

Throat Complications.—These have been considered above (see the anginose form of scarlet fever, p. 198).

Prevention.—The patient should be immediately isolated and other children of the family removed. These latter should be kept from association with other children for ten days at least in order that the disease may develop if they have been exposed; careful watch should be kept of their throats.

The hygiene of the sick-room should be the same as that in cases of smallpox (see p. 210) and all clothing dressings, utensils and discharges should be cared for in exactly the same manner. Free ventilation of the sick-room is important and a temperature of 65° to 70° F. (18° to 20° C.) should be maintained. The patient must be kept in bed, even in the mildest cases, and lightly covered, but should be sedulously guarded from draughts. Both the physician and the nurse should wear a cap and gown over their ordinary clothing when in the patient's presence and the former upon leaving

the sick-room should pass directly into the open air. A sheet wet with five per cent. carbolic acid solution and suspended before the door of the apartment is an excellent measure.

The quarantine should be continued for from six to eight weeks—longer if desquamation has not ceased during this period—and when raised both patient and nurse should bathe as after smallpox, and the apartment with its contents should be disinfected after the usual manner and thoroughly aired. Books, toys, and the like with which the patient has come in contact should be burned.

Treatment.—The general treatment of the disease is symptomatic. Considerable research has of late been carried out along the lines of serum treatment, but so far the results have been inconclusive.

The patient should receive two lukewarm sponge baths daily and if there is distressing itching and burning of the skin he may be lightly smeared with albolene, olive oil or cacao butter. This should be done twice a day when desquamation has commenced, for it is not only grateful to the patient, but also prevents the dissemination of the flakes of skin.

Copious and frequent draughts of water, plain or carbonated, should be urged upon the patient and in cases with very high temperature two cool baths—90° to 70° F. (32.2° to 21.1° C.)—should be given. The mouth, throat and nose should be subjected to frequent

spraying and cleansing with Dobell's or other alkaline solution, for by this means ear involvement may be in great measure prevented. The urine must be examined daily and the nurse should prepare a specimen each day before the physician's visit.

The Diet.—During the febrile stage the diet should be of fluids alone (see general principles of feeding in fevers, p. 64), but when the temperature has become normal, a gradual return to solid diet is advisable. In cases with albuminuria meats must not be allowed as long as this symptom persists.

The nursing should be carried on in accordance with the principles laid down for the infectious diseases.

SMALLPOX.

Synonym.—Variola.

Definition.—Smallpox, as distinguished from grand pox (syphilis), is an acute infectious disease characterized by a typical eruption appearing first in the form of macules or spots, and becoming successively papules, vesicles and pustules, upon the last of which crusts form which drop off and leave scars.

Causation.—The disease has existed as an epidemic since many centuries before Christ and until the introduction of vaccination was so universal a scourge that persons who showed no pock-marks were rarely seen. Its specific cause is believed to be a recently discovered microörganism. Smallpox is contagious

throughout its entire course after the eruption has appeared and a few moments of association with an individual suffering from it are a sufficiently long time to contract the disease. The contagion may be carried great distances in clothing, etc., and the pulverized dry crusts retain the power of transmitting the infection for several years. Inoculation from the contents of the vesicles and pustules, the scabs and the blood is possible. It is believed that the infection enters the body with the inspired air, and it probably exists in the secretions and excretions, and in the exhalations from lungs and skin. The severest type of smallpox may be contracted from a very mild case. The disease respects neither race, age nor sex and very few unvaccinated persons escape after exposure. Usually, but not always, one attack precludes the possibility of a second infection. Inasmuch as this disease occurs almost exclusively in unvaccinated persons it may be said to be a disease of choice.

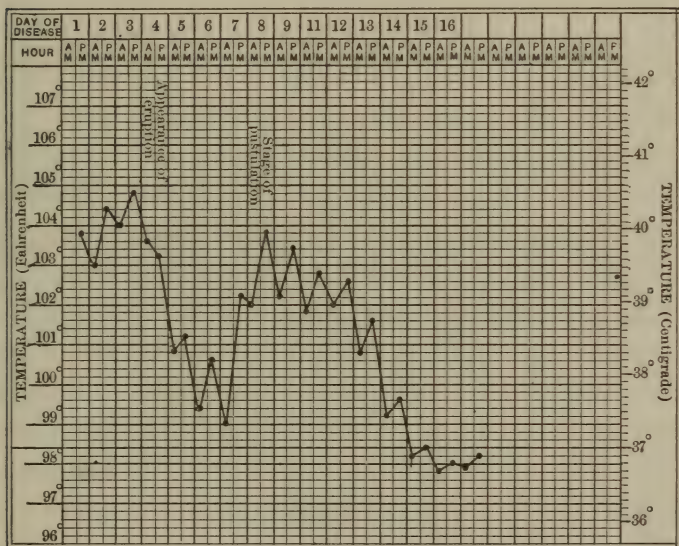
The Eruption appears about the third day, first upon the face and scalp, and spreads, finally involving most of the skin and mucous membranes. At first it is in the form of round, red spots, which by the second day become slightly elevated; by the sixth day these have become vesicles with depressed centers (umbilicated) and by the eighth day they have changed into pustules. As this last transition is taking place the skin and mucous membranes become swollen and inflamed. If

the pustules extend into the deeper layers of the skin, scars (pock-marks) result.

The eruption appears upon the tongue and the lining of the mouth and throat, rarely it extends into the esophagus and stomach; it may show itself in the rectum. In the larynx it is accompanied by inflammation and sometimes by edema. Rarely the eruption appears first upon the mucous membranes. The above is a description of the discrete form of the eruption; in the rarer types of the disease the rash may undergo various modifications.

Course and Symptoms.—The incubation period is usually from ten to fifteen days. The invasion is sudden with a distinct chill or chilly sensations followed by a rapid rise of temperature— 103° to 106° F. (39.5° to 41.1° C.). The pulse is rapid and full (100–120) the respirations are accelerated, the tongue is coated and there may be vomiting, convulsions or delirium. There are severe headache and general bodily pains. A pronounced aching pain in the small of the back is so typical as to be an aid in distinguishing smallpox from other eruptive fevers. A feeling as of shot under the skin of the palm at the base of the thumb, due to the undeveloped eruption, is another diagnostic point. There may be sore-throat and conjunctivitis; there is usually enlargement of the spleen; bleeding from the skin and mucous membranes are rarer symptoms.

On the second or third day certain rashes—not the true smallpox eruption—may appear in the form of petechiæ, streaks or diffuse blushes and reddish, brownish or purple in color. These become paler on pressure. They are not raised and may occur on any part of the body, but are most frequently seen on the inner



CLINICAL CHART OF SMALLPOX showing fall of temperature upon the appearance of the eruption and its rise upon the incidence of the stage of pustulation.

sides of the thighs and arms, the groins, upper abdomen and chest. About the third day the typical eruption appears and in a favorable case the temperature falls, the symptoms subside, the eruption passes through its

various stages, finally scabs form which drop off and leave scars behind. The healing of the eruption may be accompanied by troublesome itching.

The Confluent Form of smallpox follows a shorter period of incubation and is ushered in by severe symptoms; the temperature may rise as high as 110° F. (43.3° C.), and as the eruption appears there is very little amelioration of the patient's condition. The papules are large and when they become pustules they run together so that the skin is infiltrated with pus. The confluency may be confined to the face, hands and feet, or it may involve the entire surface of the body. The mucous membranes are swollen, much inflamed and may become gangrenous. With this inflammation all the symptoms of sepsis are present—rapid, feeble pulse, marked nervous symptoms and great prostration. An intolerable odor rises from the patient and the picture presented by him is perhaps more horrible than that in any other disease. The formation of scabs in this variety of smallpox may take three or four weeks.

The Malignant Form.—In this type of the disease the temperature may never be high, but the constitutional symptoms—especially those referable to the nervous system—and the prostration are very marked. This form of smallpox is usually fatal and death may take place before the rash—which is likely to be typical—appears.

The Hemorrhagic Form is characterized by the effusion of blood into the skin and the pustules, and bleeding from the mouth, nose, lungs, stomach or any of the mucous membranes. This type as a rule is fatal, death occurring sometimes as early as the third or fourth day. Neither this nor the malignant variety is often seen in persons who have been vaccinated.

Varioloid is true smallpox occurring in individuals who have been vaccinated and is a shorter and milder disease than the unmodified variety. The eruption is not extensive, the pocks are small and some of the vesicles may dry without becoming pustules; there is rarely any scarring. The initial symptoms are not severe with the exception of the pain in the back, and when the rash appears, which it usually does about the third or fourth day, the constitutional disturbance subsides. The eruption dries and the scabs fall from five to seven days after the appearance of the eruption.

The severe types of smallpox may be contracted by unvaccinated persons from the mild form.

Prevention.—The introduction of vaccination by Jenner at the close of the eighteenth century has caused smallpox to become a rare disease in communities where the measure is systematically practiced, and too great insistence cannot be laid upon the necessity for the routine performance of the operation. All children should be vaccinated at from three to five months of age, every seven years thereafter and in the intervals

whenever the disease is prevalent; at such times one should never be satisfied with an unsuccessful attempt. Vaccination does not always protect, but the disease as it occurs in those who have undergone the operation is very rarely severe.

Vaccination is performed as follows: The site selected is, in the case of boys, the outer side of the arm at the junction of its upper and middle thirds. In vaccinating girls in the upper walks of life it is preferable to use the outer side of the calf. Human lymph or calf lymph may be used, but the latter is preferable. The skin over the part chosen should be sterilized by washing with soap and water, alcohol and 1 to 5,000 mercury bichlorid solution, wiped with sterile water and allowed to dry. Then with a needle which has been sterilized by heating in a gas flame a surface one eighth to one fourth of an inch in diameter is lightly scratched, care being taken not to draw blood, but merely to remove the upper layers of the integument. A slight exudation of serum will follow this procedure and into this the vaccine should be rubbed for several moments. The surface should be allowed to dry and then dressed lightly with a compress of sterile gauze. The various shields sold to cover vaccination wounds should not be used. Different makers supply dried vaccine upon quills or ivory points. When from a reputable firm these may be used. The health boards of certain cities furnish calf lymph put up in glass tubes and packed

with a needle, a bit of wood and full directions for the performance of the operation. When available such an outfit should be employed.

The train of symptoms following vaccination is termed *vaccinia* and differs in different individuals. If the procedure is successful and the vaccination "takes" a papule appears about the third day; on the fifth to the seventh day this becomes a vesicle surrounded by a red area which about the eighth day becomes the seat of a suppurative process and is painful and tender. From this time the inflammation gradually subsides and about the twenty-first day the scab falls, leaving the familiar whitish scar. Protection is believed to be effected about the thirteenth day.

About the third day after vaccination there may be a rise of temperature which may last a week or more; with this there are headache, gastric disturbances, restlessness, etc., but usually these symptoms are of little moment and require no special treatment. Frequently there is enlargement and tenderness of the axillary or inguinal glands, depending upon the site of the inoculation.

Generalized Vaccinia is rare but may manifest itself as a pustular rash on different parts of the body, appearing on the eighth to the tenth day; the pustules are most abundant upon the vaccinated limb and may continue to appear for several weeks. The disease may prove fatal in children.

Complications of Vaccination.—Syphilis may follow if infected humanized lymph be used, and tetanus has been known to result from the employment of contaminated bovine virus. Erysipelas and septicemia are possible complications but proper antiseptic precautions will prevent their occurrence.

When a case of smallpox appears in the community, every person who has recently associated with the individual should immediately be vaccinated, no matter how short a time previously this has been done. It is also wise to vaccinate the patient, though this seldom results in any modification of the disease.

The patient should be subjected to the strictest isolation, no one being allowed to approach him but his nurse and physician. It is best to procure a nurse who has had the disease, but if this is impossible, one who has recently been vaccinated successfully. The nurse and physician should wear caps of oiled silk or rubber and linen or cotton gowns enveloping the whole figure when in the sick-room. Their visits to the patient should be as brief as possible. The room in which the patient is confined should be emptied of all draperies and superfluous furniture and should be thoroughly ventilated at all times. An apartment with a fire-place is best, for in addition to improving ventilation this offers a place for burning all contaminated substances. All the patient's excreta should be disinfected as described in Chapter IV. and it is wise to suspend before

the door a sheet, wet with five per cent. carbolic acid solution, just outside which disinfectants should be kept in which physician and nurse may wash hands and face after leaving the patient. All washable clothing both of nurse and patient should be soaked in a disinfecting solution for from six to ten hours before it is taken to the laundry and then it should be thoroughly boiled. After the patient's recovery or death everything with which he has come in contact should be burned. If there is a disinfecting plant available the mattresses and bedding may be disinfected by steam under pressure, but either this process or burning is absolutely necessary. When the quarantine is raised, which must not be done until the last scab has fallen, the patient and nurse should bathe in a 1 to 2,000 mercury bichlorid solution, carefully protecting the eyes; the hair should be shampooed and clean clothing put on in another room.

If the patient dies the body should be wrapped in a sheet wet with 1 to 2,000 mercury bichlorid solution, sealed in a metal coffin and cremated or buried as soon as possible.

The apartment should be disinfected according to the usual methods and thoroughly aired.

Treatment.—The treatment of the disease is symptomatic. The patient's hair should be cut short, and the tendency to pitting may be lessened if strict attention is paid to cleanliness, and if the patient wears,

to keep him from scratching, gloves and a gauze mask moistened with either two per cent. carbolic acid or a saturated boric acid solution. Frequent immersions in warm water or cleansing with hydrogen peroxid solution will aid in keeping the skin clean and free from pus. A thin ointment of ichthyol of 10% strength is very soothing to the face.

The feeding and nursing, on points other than those discussed above, should be conducted according to general principles.

CHICKEN POX.

Synonym.—Varicella.

Definition.—An acute, infectious, febrile disease of mild type characterized by a vesicular eruption.

Causation.—The disease is sporadic and occurs also at times in epidemics. It is essentially a disease of children and but very rarely is seen in the adult. It occurs in all climates and at all seasons. Its specific cause has not yet been discovered but is probably a bacterium. The contagium is given off from the patient and it probably effects entrance to the body with the inspired air. One attack usually, but not invariably, confers immunity.

The Eruption as a rule appears on the first day of the disease, first upon the face and scalp, later upon the neck, body and limbs. The rash begins as a rounded red spot which quickly becomes a papule and reaches the vesicular stage within a few hours. The

vesicles vary in size from one sixteenth to one half inch in diameter. Occasionally a few vesicles go on to the pustular form. There is no umbilication and when pricked the vesicle collapses entirely, which is not the case in smallpox. The eruption lasts from two to five days, when the vesicles dry, form crusts and soon fall, leaving no scar. The pustules may leave a slight depression which is almost never permanent. Successive crops appear and we may see the eruption in all stages at the same time. If the vesicles are scratched they may leave cicatrices. The eruption may appear on the mouth and throat.

Course and Symptoms.—The incubation period is from ten to fifteen days; the period of invasion lasts one or two days with slight fever and malaise. The onset is marked by chilly feelings, seldom by convulsions, moderate fever (100° to 102° F.— 37.8° to 38.9° C.), general pains, nausea and prostration. The eruption appears within twenty-four hours and the fever and other symptoms rarely last more than two or three days.

Complications are infrequent.

Prevention.—The patient should be isolated until the last crust has fallen; then the sick-room may be disinfected but cleaning and airing are usually sufficient.

Treatment is usually unnecessary except in so far as cleanliness is concerned. The large vesicles may be

opened and washed with boric acid solution ; the itching may be relieved by the application of olive oil which will also be found useful in loosening the crusts. It may be necessary to mitten the patient's hands to prevent scratching. In any case the finger nails should be kept short and frequently cleansed with soap, water and a brush.

During the febrile stage, fluid diet is to be preferred, but as soon as the temperature reaches normal easily digested solids may be given.

Nursing should be conducted in accordance with general principles.

MEASLES.

Synonyms.—Rubeola ; morbilli.

Definition.—Measles is an acute, infectious fever characterized by congestion of the upper air passages and conjunctivæ and accompanied by an eruption of maculo-papular form.

Causation.—The disease is commonly endemic, epidemics appearing at intervals. It usually appears in children, but adults often contract it ; it is most prevalent in the cold months. Its specific cause is a germ which has not yet been discovered. The infection is spread by contact, by the breath, the secretions, especially those of the nose, by articles which have come in contact with sufferers from the disease and through a third person. One attack usually, but by no means

always, confers immunity; several attacks in the same individual have been observed.

The Eruption appears about the fourth day, is maculo-papular in form and the spots, at first roundish, rose-colored, slightly elevated papules, tend to coalesce into a crescentic shape. The rash appears first on the face and mucous membranes, then upon the body and last upon the extremities; it is fully developed in from two to four days and then gradually fades. In from ten to fourteen days fine desquamation takes place. Rarely the rash may be vesicular or hemorrhagic.

A day or two before the eruption small red spots from the size of a pin-head to that of a split pea appear on the lining of the cheeks and mouth. At the center of these is a bluish-white spot which may be made out with the aid of a strong light. These are known as Koplik's spots and are a certain and early diagnostic sign of the disease.

Course and Symptoms.—The incubation period is from ten to fourteen days; the period of invasion usually lasts four days. The disease is ushered in by chills or convulsions followed by a rise in temperature to 105° to 106° F. (40.5° to 41.1° C.), headache, prostration, rapid pulse, vomiting and at times diarrhea. There are usually conjunctivitis and rhinitis; the tongue is coated and the glands of the neck may be swollen. During the height of the fever stupor or delirium may be present. In from ten to fourteen days

Complications.—Convalescence may be interrupted by a continuance of the conjunctivitis, by pharyngitis, inflammations of the ear or of the lymph glands, bronchitis and, most important of all, bronchopneumonia. Whooping-cough or diphtheria may be associated with the disease. The inflamed glands offer a fertile field for infection by the tubercle bacillus and such an infection may be followed by acute miliary tuberculosis.

Prevention.—The measures to be taken to prevent the spread of the disease are the same as those applicable in scarlatina, but are less likely to be successful, for the contagium, although its life is shorter, seems to be much more easily diffusible. The patient should be isolated in an airy room, protected from draughts and not allowed to associate with others until at least two weeks have elapsed since the onset. Many parents encourage their children to expose themselves on the principle that every one must contract the disease, but this is little less than criminal.

All discharges, dressings, clothing, etc., should be disinfected according to the usual methods.

Treatment.—The patient should be kept in bed in a dark room while the temperature is elevated and should be given at least one sponge bath daily with cool water. A disinfecting bath for both patient and nurse at the termination of the period of isolation is an essential. The eyes should receive careful attention; a few

drops of a saturated solution of boric acid should be dropped into them every four hours and the nose should be kept clean by means of an antiseptic such as Dobell's solution. During desquamation the skin should be anointed with albolene or cacao butter. The treatment in other respects consists in the combating of the symptoms as they arise.

The Diet during the febrile movement should be entirely fluid—milk, broths and the like—and the drinking of cool water is to be encouraged. As convalescence progresses a gradual return to solid diet is proper.

The nursing applicable to the other infectious exanthemata is equally suited to measles.

GERMAN MEASLES.

Synonyms.—Roseola; Rubella; Rötheln.

Definition.—An acute, infectious febrile disease, accompanied by a maculo-papular eruption and enlargement of the lymph-glands of the neck. Roseola may resemble measles and scarlet fever in its symptoms, but it is a distinct disease.

Causation.—The disease occurs most frequently in children, although it may be contracted by adults; it is most commonly observed during the cold months. The specific cause of the disease has not been discovered, but the infection seems to be given off in the expired air and from the skin. Usually one attack gives protection against further infection.

The Eruption appears upon the first or second day of the disease, first upon the forehead and spreads quickly over the face, neck, body and finally the extremities. It is in the form of round pinkish points one sixteenth to one fourth of an inch in diameter, slightly elevated and, at first, disappears on pressure. The spots may be aggregated into blotches resembling the rash of measles but are less frequently crescent-shaped, or into a diffuse redness resembling scarlet fever. The rash lasts from one to seven days and may fade in one place before appearing in another. Occasionally some of the papules may turn into vesicles or pustules. Desquamation seldom takes place.

Course and Symptoms.—The incubation period is from one to three weeks; its average is about ten days. The invasion resembles that of measles, but is less severe; the appearance of the rash may be the first symptom. The onset is marked by chilly feelings, slight fever, headache, nausea, catarrhal inflammation of the mucous membranes lining nose, throat and eyes, and swelling of the lymph-glands of the neck, rarely of those of the groins and axillæ. When the rash is fully developed the fever may reach 102° to 103° F. (38.9° to 39.5° C.), and all the symptoms are accentuated. After a few days the rash fades and the symptoms disappear.

Complications and relapses are rare.

Prevention.—The patient should be kept to himself in a darkened room, if the eyes are affected, for ten days or two weeks, but the thorough disinfection necessary during and after measles and scarlet fever is not required.

Treatment is usually unnecessary, but the patient should be kept in bed if possible.

The Diet should be regulated in accordance with the patient's condition; the nursing may be conducted according to general rules.

THE "FOURTH DISEASE" OF DUKES.

This is considered by Dukes to be an independent disease of mild character which simulates mild scarlatina, but differs from it in that its incubation period is much longer, being from nine to twenty-one days, and in its lack of prodromal symptoms. The eruption resembles that of scarlatina except that it begins upon the face; it is usually followed by profuse desquamation.

Many authorities doubt the existence of this as a separate disease and it is certain that, before its identity can be established beyond question, further study must be made of German measles.

No especial consideration of the treatment or nursing of "Fourth Disease" is necessary.

EPIDEMIC CEREBROSPINAL MENINGITIS.

Synonyms.—Cerebrospinal fever; spotted fever; malignant purpuric fever; petechial fever.

Definition.—An acute infectious fever appearing usually in epidemics and characterized by inflammation of the membranes of the brain and spinal cord and commonly by an eruption.

Causation.—The disease is most likely to appear in crowded localities amid unsanitary surroundings and is most often seen in the cold months. Children are more prone to contract the infection than grown persons. The specific cause of this variety of meningitis is a bacillus which reaches the membranes of the brain and spinal cord through the nose or having been breathed into the lungs finds access to the blood-stream and is carried by this medium. The contagion is probably not transmitted by the excreta or from one person to another.

Course and Symptoms.—The period of incubation is not certainly known. The onset is sudden and accompanied by a chill followed by fever, severe pain in the back of the head, projectile vomiting, soreness at the back of the neck and inclination to bend the head backward. There are various symptoms referable to the eyes; dread of light, squint, falling of the upper lid, unequal pupils and movements of the eyeball from side to side. Sounds annoy the patient. There is often nose-bleed, and fever sores upon the lips are frequent. Delirium soon appears.

The temperature curve shows great irregularity, being high at times, then dropping to normal only to

rise suddenly again. The typical pulse is slow in comparison with the height of the fever, but some patients exhibit a rapid heart action.

Small petechiæ or larger purpuric spots may appear upon the body and there may be erythematous patches. During the disease there are likely to be convulsive movements of the extremities, and the legs are usually drawn up. The head is forced into the pillow, and the facial expression is typical—the *risus sardonius*—the forehead is wrinkled and the teeth are exposed by the drawing outward of the corners of the mouth. Children are likely to make an outcry typical of the disease. It is a single, high shrill cry and when once heard is easily recognized.

The patient becomes rapidly emaciated and bed-sores are almost certain to ensue. The bowels are usually constipated and in the late stages there may be inability to swallow, in which case food must be given through a tube passed into the stomach through the nostril, or by rectum. As the disease progresses the nervous irritability ceases and the patient becomes stuporous or even comatose and there is incontinence of urine and feces.

In patients who recover the fever lasts several weeks and then gradually falls; as this takes place the symptoms slowly ameliorate. Relapses sometimes occur.

Convalescence is protracted.

Different varieties of the disease may occur as follows:

(a) *The Mild Type* with dizziness, headache, stiffness of the neck, and low temperature.

(b) *The Intermittent Type* in which the symptoms improve at intervals of a few days but recur.

(c) *The Malignant Type* in which hemorrhages take place into the skin, the symptoms are intense and death takes place within a few hours.

(d) *The Chronic Type* which may last for several months with severe symptoms and marked emaciation.

Complications.—Pneumonia is the most common of these. Patients may recover with deafness or blindness and in children physical and mental development are frequently interfered with.

Treatment.—Isolation in a quiet, darkened room is necessary. The head must be shorn and an ice cap applied, and cold applications may be made to the spine. The delirium and convulsions should be controlled by sedatives and the temperature by cold sponging.

During convalescence the different tonics are indicated.

The Diet.—The nurse should do her utmost to maintain the nutrition of the patient by the frequent administration of nourishing foods in fluid or semi-fluid form. When swallowing has become impossible feeding by rectum and by gavage must be employed. During the stage of convalescence it is necessary that

the patient should receive liberal feeding in order that he may regain his strength as rapidly as possible.

The nursing otherwise should be conducted along the usual lines.

CHAPTER IX.

THERMIC FEVER.

Heat Exhaustion: Insolation.

Synonyms.—Sun-stroke; heat-stroke; heat prostration.

Definition.—A condition of prostration caused by exposure to intense heat.

Causation.—Thermic fever is most common in adult males, probably because of their greater liability to exposure and tendency to alcoholic habits. It also occurs frequently in infants. It is predisposed to by over-indulgence in exercise, food and alcohol. Soldiers on the march, stokers in the fire-rooms of steamers, bakers and others whose occupations necessitate exposure to the sun or to extremes of artificial heat, are frequent sufferers.

HEAT EXHAUSTION.

Course and Symptoms.—This affection is the result of continued exposure to high temperatures especially when combined with muscular exertion and is characterized by prostration, collapse, subnormal temperature—95° to 97° F. (35° to 36.1° C.)—and small, quick pulse; the surface of the body is usually cool and in severe cases there may be delirium.

INSOLATION.

Course and Symptoms.—In the milder type of this affection the onset is marked by headache, dizziness, prostration and possibly nausea and vomiting. Unconsciousness may follow. The skin is flushed, hot and dry, the temperature ranges from 104° to 112° F. (40° to 44° C.) or even higher, the pulse is rapid and full, the breathing may be difficult and stertorous; the pupils usually are contracted. In the fatal cases the unconsciousness becomes more profound, the heart weaker, the respiration rapid and shallow and death may supervene within from twelve to thirty-six hours. In favorable cases a fall in temperature is accompanied by a remission of the other symptoms. Complete recovery may ensue or the patient may be left with nervous and mental disturbances varying from simple loss of memory to insanity. A common sequel is inability to bear even slight degrees of heat; individuals with this idiosyncrasy have been known to become very uncomfortable at as low a temperature as 80° F. (26.7° C.).

In marked cases the patient may die suddenly or within a short time with all the symptoms of heart failure such as rapid almost imperceptible pulse, extreme dyspnea, and unconsciousness.

Prevention consists in the avoidance of extreme heat, abstinence from alcohol, over-eating and over-work; plenty of water should be drunk, frequent baths are advisable and the clothing should be light.

The Treatment of Heat Exhaustion consists in rest in a cool place and stimulation.

The Treatment of Thermic Fever consists in endeavors to lower the bodily temperature as rapidly as possible. If a bath tub is available the patient should be immersed in cool water and rubbed vigorously with lumps of ice in the hands of at least two attendants. If no tub is at hand, the patient should be placed in the shade and cool water dashed upon him. Syncope may be controlled by hypodermatic injections of alcohol and such other stimulants as ether and ammonia may be given by the same means; artificial respiration may be necessary. If tubbing is impossible ice water enemas may accomplish good results; sprinkle baths from a watering pot, held at a height, or from a hose seem to have a good effect, probably from the stimulation caused by the impact of the water against the body.

The temperature should be taken at frequent intervals and when it has reached 102° F. (38.9° C.) the hydriatic measures should be stopped, for otherwise the temperature is likely to fall to a subnormal level and collapse may result. The patient should now be put to bed, given a cathartic and catheterized if necessary; he should remain in bed and on a light diet for a few days. Subsequent rises of temperature may be controlled by cold sponging or tub baths if necessary; otherwise no departure from the general principles of nursing in febrile conditions need be made.

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